

U.S. Congress. House. Comm. on Merchant Marine & Fisheries
NATIONAL OCEANOGRAPHIC PROGRAM—1969

PART 2

HEARINGS

BEFORE THE

SUBCOMMITTEE ON OCEANOGRAPHY

OF THE

COMMITTEE ON

MERCHANT MARINE AND FISHERIES

HOUSE OF REPRESENTATIVES

NINETY-FIRST CONGRESS

FIRST SESSION

ON

**A report by the Commission on Marine Science, Engineering,
and Resources entitled "Our Nation and the Sea"**

AND

H.R. 13247, H.R. 14089, H.R. 14418

**BILLS TO AMEND THE MARINE RESOURCES AND ENGI-
NEERING DEVELOPMENT ACT OF 1966 TO ESTABLISH A
COMPREHENSIVE AND LONG-RANGE NATIONAL PROGRAM
OF RESEARCH, DEVELOPMENT, TECHNICAL SERVICES,
EXPLORATION, AND UTILIZATION WITH RESPECT TO OUR
MARINE AND ATMOSPHERIC ENVIRONMENT**

**AUGUST 5, 6, 7, 12, 13, SEPTEMBER 16, 18, 23, 24, 25,
OCTOBER 1, 9, 14, 21, 1969**

Serial No. 91-13

**Printed for the use of the
Committee on Merchant Marine and Fisheries**



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² Appointed to subcommittee effective September 18, 1969.

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NATIONAL OCEANOGRAPHIC PROGRAM

TUESDAY, AUGUST 5, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:15 a.m., pursuant to notice, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. It is my pleasure this morning to recognize the chairman of the Committee on Merchant Marine and Fisheries for a statement relating to the subject matter that we are now about to consider. Mr. Chairman.

Mr. GARMATZ. Thank you, Mr. Chairman.

In April of this year, this subcommittee initiated a series of 12 public hearings on a proposed national oceanographic program. Today's hearing is a continuation of our examination of that proposed program—which is embodied in the comprehensive report of the Commission on Marine Science, Engineering, and Resources.

But I think it should be emphasized today that we are not simply embarking upon a resumption of hearings on this proposed national oceanographic program, which is now referred to as the "Stratton Report." You might say that this subcommittee has moved into a second phase of activity. That phase started when—on July 31, 1969—Congressman Lennon, the distinguished chairman of this subcommittee, introduced a bill which bears the number H.R. 13247.

I think this bill will become a piece of landmark legislation, because I think it will mark the turning point in our national oceanographic effort.

Basically, this bill is designed to implement two of the Stratton report's recommendations: the establishment of an independent national oceanographic agency, and the simultaneous establishment of a National Advisory Committee.

Both of these recommendations are already well known, but what I want to stress today is the significance of Congressman Lennon's bill. First of all, it was cosponsored by every member of the Subcommittee on Oceanography; as chairman of the full committee, I am proud to say that I am also a cosponsor. Second, this bill was not introduced in haste: it represents a congressional conviction, and this conviction was reached only after a comprehensive series of hearings documented the need for congressional action.

Other bills to establish a so-called NOAA have already been introduced—this is true. But all these earlier bills propose to do is to transfer present Government functions from existing agencies to a newly created agency. The bill introduced by Congressman Lennon represents the first legislative attempt to cope with the total organizational problem; it would do this by establishing both an NOAA and a National Advisory Committee. Both of these are essential; one complements the other, and they should be considered together—as an integral package.

Finally, I would like to welcome to our committee the distinguished Senator from Rhode Island, the Honorable Claiborne Pell. He is a recognized authority on oceanography, and I am sure his testimony will add a valuable contribution to these important hearings.

Thank you very much, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Chairman.

Today we are resuming our public hearings on the report of the Commission on Marine Science, Engineering, and Resources entitled "Our Nation and the Sea." In doing so, we are continuing the initiative, begun in May and June, in receiving the opinions of the best-informed experts the Nation can offer on the subject of a coordinated national policy for the utilization of the oceans and their resources.

The subcommittee places special emphasis on the importance of these hearings and upon the need to give careful and serious consideration to the recommendations of the Commission—recommendations made after more than 2 years of dedicated efforts on the part of the extremely distinguished and well-qualified Commissioners.

We feel a special responsibility to carry forward this work set in motion by the Marine Resources and Engineering Development Act of 1966. Accordingly, on last Thursday, it was my pleasure to introduce a bill that has as its purpose the implementation of the Commission's recommendation for the establishment of a National Oceanic and Atmospheric Agency and a companion National Advisory Committee for Oceans and Atmosphere. I am particularly pleased that I was joined in this endeavor by Mr. Garmatz, under whose leadership the Committee on Merchant Marine and Fisheries has moved progressively forward, and all 20 members of the subcommittee. I hope that this bill will provide further focus for discussion that will lead to the formulation of effective national policy.

During this week and the next, we shall continue to hear from distinguished experts from various disciplines, primarily in the private sector. Beginning in September, we shall be pleased to hear the testimony of prominent members of those branches of the Federal agencies most affected by the recommendations of the Commission's report.

Without objection, a copy of the bill and agency reports will be inserted at this point in the record.

(The bill, H.R. 13247, and agency reports follow:)

91st CONGRESS
1st SESSION

**H. R. 13247,
H. R. 14089, H. R. 14418
BILLS**

To amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That the Marine Resources and Engineering Development
4 Act of 1966 (33 U.S.C. 1101-1108) is amended to read as
5 follows:

2

1 "TITLE I—NATIONAL OCEANIC AND ATMOS-
2 PHERIC PROGRAM

3 "SHORT TITLE

4 "SEC. 101. This title may be cited as the 'National
5 Oceanic and Atmospheric Program Act of 1969'.

6 "DECLARATION OF POLICY AND OBJECTIVES

7 "SEC. 102. (a) The Congress declares that it is the
8 policy of the United States to encourage, develop, and main-
9 tain a comprehensive, coordinated and continuing national
10 program in marine and atmospheric science, technology,
11 and technical services for the benefit of mankind through
12 the enhancement of commerce, transportation, and national
13 security; the protection of health and property; the rehabili-
14 tation of our commercial fisheries; and the increased utiliza-
15 tion of these and other resources. Such national program
16 should be conducted so as to contribute to the following
17 objectives:

18 "(1) The accelerated development and utilization of
19 the resources of the marine environment.

20 "(2) The expansion of human knowledge of the marine
21 and atmospheric environment.

22 "(3) The encouragement of private investment enter-
23 prise in exploration, technological development, marine com-
24 merce, and economic utilization of the resources of the marine
25 environment.

3

1 “(4) The development and improvement of the capabil-
2 ities, performance, use, and efficiency of vehicles, equipment,
3 and instruments for use in exploration, research, monitoring
4 and prediction, surveys, the recovery of resources, and the
5 transmission of energy in the marine and atmospheric
6 environment.

7 “(5) The advancement of education and training in
8 marine and atmospheric science, technology, and technical
9 services.

10 “(6) The advancement of capability to observe and
11 predict environmental changes, and ultimately to modify
12 the environment, in order to enhance the safety and welfare
13 of the public and to permit more efficient use of the oceans
14 and the atmosphere.

15 “(7) The effective utilization of the scientific and engi-
16 neering resources of the Nation, with close cooperation
17 among all interested agencies, public and private, in order to
18 avoid unnecessary duplication of effort, facilities, and equip-
19 ment in marine and atmospheric programs.

20 “(8) The preservation of the role of the United States
21 as a leader in marine and atmospheric activities and in
22 marine resource development and conservation.

23 “(9) The cooperation by the United States with other
24 nations and with international organizations in marine and

4

1 atmospheric activities when such cooperation is in the na-
2 tional interest.

3 “(b) The Congress further declares that such a compre-
4 hensive national program can only be achieved through the
5 establishment of a new agency of the United States Govern-
6 ment which is given the requisite authority and support to
7 administer and coordinate the Nation’s civil marine and
8 atmospheric endeavors.

9 “NATIONAL OCEANIC AND ATMOSPHERIC AGENCY

10 “SEC. 103. (a) There is established, as an independent
11 agency within the executive branch of the Government, the
12 National Oceanic and Atmospheric Agency (hereafter re-
13 ferred to in this title as the ‘Agency’). The Agency shall
14 be headed by an Administrator, who shall be appointed
15 from civilian life by the President by and with the advice
16 and consent of the Senate. Under the supervision and direc-
17 tion of the President, the Administrator shall be responsible
18 for the exercise of all powers and the discharge of all duties
19 of the Agency, and shall have authority and control over
20 all personnel and activities thereof.

21 “(b) There shall be in the Agency a Deputy Adminis-
22 trator who shall be appointed by the President by and with
23 the advice and consent of the Senate and shall perform such
24 functions, powers and duties as the Administrator shall from
25 time to time prescribe. The Deputy Administrator shall act

5

1 for, and exercise the powers of, the Administrator during the
2 absence or disability of, or in the event of a vacancy in the
3 office of, the Administrator.

4 “(c) There shall be in the Agency a General Counsel
5 who shall be appointed by the President by and with the
6 advice and consent of the Senate and shall perform such
7 functions, powers and duties as the Administrator shall from
8 time to time prescribe.

9 “FUNCTIONS OF THE AGENCY

10 “SEC. 104. (a) The Agency, in order to carry out the
11 purposes of this title, shall plan, direct, conduct, and
12 support—

13 “(1) the advancement of fundamental understand-
14 ing of the biological, physical, geological, and chemical
15 characteristics of the marine environment and of the
16 atmosphere;

17 “(2) the development of fundamental technology,
18 including equipment, techniques, and facilities, necessary
19 to achieve more effective use of the marine environment
20 and to operate with greater efficiency and safety in the
21 atmosphere;

22 “(3) the rehabilitation of United States fisheries
23 through the research, development, and encouragement
24 of the use of improved management practices and har-

6

1 vesting techniques and new concepts of search, detec-
2 tion, transportation and processing;

3 “(4) the implementation of manpower programs
4 to strengthen education and training at all levels and in
5 all specialties appropriate with respect to marine and at-
6 mospheric sciences and engineering;

7 “(5) the acquisition, analysis and widest practicable
8 and appropriate dissemination of information relevant to
9 marine and atmospheric science and technology, includ-
10 ing the development of a national system for monitoring
11 and predicting the state of the oceans and the atmos-
12 phere;

13 “(6) surveys to identify, locate, and measure living
14 and mineral resources of the marine environment;

15 “(7) exploration of the marine environment, in-
16 cluding the development, construction, testing and op-
17 eration of vehicles and associated equipment;

18 “(8) the advancement of aquaculture;

19 “(9) the development of techniques for evaluating
20 and undertaking planned modifications of the marine and
21 atmospheric environments, including field experiments;

22 “(10) the provision of technical and operating
23 services, including the mapping and charting of the
24 marine environment, marine navigation, safety at sea,

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1 policing and enforcement in marine areas, and instru-
2 ment testing and calibration; and

3 “(11) programs to provide information and serv-
4 ices to Federal, State, regional and local agencies with
5 respect to problems concerning multiple uses of the
6 marine environment.

7 “(b) The Agency shall carry out the functions specified
8 in subsection (a) in a manner to encourage private invest-
9 ment enterprise in the exploration, development, and utiliza-
10 tion of marine resources.

11 “(c) (1) The Administrator shall, among his respon-
12 sibilities, exercise leadership under the direction of the Presi-
13 dent in all Federal civil marine and atmospheric matters,
14 make recommendations concerning such matters to the
15 President and the Congress for their consideration and imple-
16 mentation, and consult with the heads of other Federal de-
17 partments and agencies on the marine and atmospheric activi-
18 ties of the Government in order to encourage a vigorous and
19 coordinated attack on common objectives.

20 “(2) The Administrator, under the foreign policy guid-
21 ance of the President, may engage in a program of inter-
22 national cooperation in work done pursuant to this title, and
23 in the peaceful application of the results thereof, pursuant to

1 agreements made by the President with the advice and con-
2 sent of the Senate.

3 “(d) The Administrator shall cause a seal of office to
4 be made for the Agency of such device as he shall approve,
5 and judicial notice shall be taken of such seal.

6 “(e) The Administrator shall, as soon as practicable
7 after the end of each fiscal year, make a report in writing to
8 the President for submission to the Congress on the activities
9 of the Agency during the preceding fiscal year.

10 “POWERS OF THE AGENCY

11 “SEC. 105. In the performance of its functions under
12 this title, the Agency is authorized—

13 “(1) to make, promulgate, issue, rescind, and
14 amend rules and regulations governing the manner of
15 the operations of the Agency and the exercise of the
16 powers vested in it by law;

17 “(2) subject to the civil service and classification
18 laws, to select, appoint, employ and fix the compensa-
19 tion of such officers and employees as are necessary to
20 carry out the provisions of this title and to prescribe
21 their authority and duties; except that (A) to the extent
22 the Administrator deems such action necessary to the
23 discharge of his responsibilities he may appoint not more
24 than of the scientific, engineering, and administra-
25 tive personnel of the Agency without regard to such

1 laws, and may fix the compensation of such personnel
2 not in excess of the maximum rate for GS-18 of the
3 General Schedule under section 5332 of title 5, United
4 States Code, and (B) to the extent the Administrator
5 deems such action necessary to recruit specially qualified
6 scientific and engineering talent, he may establish the
7 entrance grade for scientific and engineering personnel
8 without previous service in the Federal Government at a
9 level two grades higher than the grade provided for such
10 personnel under such General Schedule and fix their
11 compensation accordingly. Notwithstanding any provi-
12 sion of this title or other law, a member of the Coast
13 Guard on active duty may be appointed, detailed, or
14 assigned to any position in the Agency other than
15 Administrator or Deputy Administrator;

16 “(3) to acquire (by purchase, lease, condemnation
17 or otherwise), construct, improve, repair, operate, and
18 maintain laboratories, research and testing sites and
19 facilities, marine and atmospheric vehicles, quarters and
20 related accommodations for employees and dependents
21 of employees of the Agency, and such other real and
22 personal property (including patents), or any interest
23 therein, as the Agency deems necessary within and
24 outside the continental United States; to acquire by

1 lease or otherwise, through the Administrator of Gen-
2 eral Services, buildings or parts of buildings in the
3 District of Columbia for the use of the Agency for a
4 period not to exceed ten years without regard to section
5 34 of title 40, United States Code; to lease to others
6 such real and personal property; to sell and otherwise
7 dispose of real and personal property (including patents
8 and rights thereunder) in accordance with the pro-
9 visions of the Federal Property and Administrative
10 Services Act of 1949; and to provide by contract or
11 otherwise for cafeterias and other necessary facilities
12 and services for the welfare of employees of the Agency
13 at its installations and purchase and maintain equipment
14 therefor;

15 “(4) without regard to section 529 of title 31,
16 United States Code, to enter into and perform such con-
17 tracts, leases, cooperative agreements, or other trans-
18 actions as may be necessary in the conduct of the work
19 of the Agency and on such terms as he may deem ap-
20 propriate, with any agency or instrumentality of the
21 United States, or with any State, territory, or possession,
22 or any political subdivision thereof, or with any public
23 or private person, firm, association, corporation, or
24 educational institution;

25 “(5) to accept, hold, administer, and utilize gifts

1 and bequests of property, both real and personal, for
2 the purpose of aiding or facilitating the work of the
3 Agency and such gifts and bequests of money and the
4 proceeds from sales of other property received as gifts
5 or bequests shall be deposited in the Treasury in a sepa-
6 rate fund and shall be disbursed upon order of the
7 Administrator. Property accepted pursuant to this para-
8 graph, and the proceeds thereof, shall be used as nearly
9 as possible in accordance with the terms of the gift or
10 bequest. Upon the request of the Administrator, the
11 Secretary of the Treasury may invest and reinvest in
12 securities of the United States or in securities guaranteed
13 as to principal and interest by the United States any
14 moneys contained in such fund and the income accruing
15 from such securities, and any other property held by the
16 Secretary under this paragraph, shall be deposited to the
17 credit of the fund and shall be disbursed upon order of
18 the Administrator;

19 “(6) to obtain the services of experts and consult-
20 ants in accordance with section 3109 of title 5, United
21 States Code, but at a rate not to exceed \$100 per diem
22 per individual unless otherwise specified in an appro-
23 priation Act;

24 “(7) with the approval of the President, to enter
25 into cooperative agreements under which members of

12

1 the Army, Navy, Air Force, and Marine Corps may be
2 detailed by the appropriate Secretary for services in the
3 performance of functions under this title to the same
4 extent as that to which they might be lawfully assigned
5 in the Department of Defense;

6 “(8) to establish a working capital fund, to be
7 available without fiscal year limitation, for expenses
8 necessary for the maintenance and operation of such
9 common administrative services as he shall find to be
10 desirable in the interest of economy and efficiency in
11 the Agency, including such services as a central supply
12 service for stationery and other supplies and equipment
13 for which adequate stocks may be maintained to meet
14 in whole or in part the requirements of the Agency;
15 central messenger, mail, telephone, and other communi-
16 cations services; office space, central services for docu-
17 ment reproduction, and for graphics and visual aids; and
18 a central library service. The capital of the funds shall
19 consist of any appropriations made for the purpose of
20 providing capital (which appropriations are hereby
21 authorized) and the fair and reasonable value of such
22 stocks of supplies, equipment and other assets and in-
23 ventories on order as the Administrator may transfer to
24 the fund, less the related liabilities and unpaid obliga-
25 tions. Such funds shall be reimbursed in advance from

1 **available funds of the Agency, or from other sources, for**
2 **supplies and services at rates which will approximate the**
3 **expense of operation, including the accrual of annual**
4 **leave and the depreciation of equipment. The fund shall**
5 **also be credited with receipts from sale or exchange of**
6 **property and receipts in payment for loss or damage to**
7 **property owned by the fund. There shall be covered into**
8 **the United States Treasury as miscellaneous receipts any**
9 **surplus found in the fund (all assets, liabilities, and prior**
10 **losses considered) above the amounts transferred or**
11 **appropriated to establish and maintain said fund;**

12 “(9) to appoint such committees as shall be ap-
13 propriate for the purpose of consultation with and ad-
14 vice to the Agency in performance of its functions. Mem-
15 bers of such committees, other than those regularly em-
16 ployed by the Federal Government, while attending
17 meetings of such committees or otherwise serving at the
18 request of the Administrator, may be paid compensa-
19 tion at rates not exceeding those authorized for indi-
20 viduals under paragraph (6) of this section, and while
21 so serving away from their homes or regular places
22 of business, may be allowed travel expenses, including
23 per diem in lieu of subsistence, in the same manner as
24 the expenses authorized by section 5703 (b) of title 5,

1 United States Code, for persons in the Government
2 service employed intermittently;

3 “(10) to use, with their consent, the services, equip-
4 ment, personnel, and facilities of Federal and other agen-
5 cies with or without reimbursement, and on a similar
6 basis to cooperate with other public and private agencies
7 and instrumentalities in the use of services, equipment,
8 and facilities. Each department and agency of the Fed-
9 eral Government shall cooperate fully with the Agency
10 in making its services, equipment, personnel, and facili-
11 ties available to the Agency, and any such department
12 or agency is authorized, notwithstanding any other pro-
13 vision of law, to transfer to or to receive from the
14 Agency, without reimbursement, ships, submersibles and
15 other vehicles, and supplies and equipment other than
16 administrative supplies or equipment; and

17 “(11) to establish within the Agency such offices
18 and procedures as may be appropriate to provide for the
19 greatest possible coordination of its activities under this
20 title with related scientific and other activities being car-
21 ried on by other public and private agencies and organi-
22 zations.

1 “NATIONAL ADVISORY COMMITTEE FOR OCEANS AND
2 ATMOSPHERE

3 “SEC. 106. (a) There is hereby established a committee
4 of fifteen members to be known as the National Advisory
5 Committee for Oceans and Atmosphere (hereafter referred
6 to in this title as the ‘Advisory Committee’).

7 “(b) (1) The members, who shall not be full-time offi-
8 cers or employees of the United States, shall be appointed by
9 the President, with the advice and consent of the Senate, and
10 shall be drawn from State and local government, industry,
11 science, and other appropriate areas.

12 “(2) Except as provided in paragraphs (3) and (4),
13 members shall be appointed for terms of five years.

14 “(3) Of the members first appointed—

15 “(A) three shall be appointed for a term of one
16 year,

17 “(B) three shall be appointed for a term of two
18 years,

19 “(C) three shall be appointed for a term of three
20 years,

21 “(D) three shall be appointed for a term of four
22 years, and

1 “(E) three shall be appointed for a term of five
2 years,
3 as designated by the President at the time of appointment.

4 “(4) Any member appointed to fill a vacancy occurring
5 prior to the expiration of the term for which his predecessor
6 was appointed shall be appointed only for the remainder
7 of such term. A member may serve after the expiration of
8 his term until his successor has taken office.

9 “(c) Each department and agency of the Federal
10 Government concerned with marine and atmospheric matters
11 shall designate a senior policy official to participate as ob-
12 server in the work of the Advisory Committee and to offer
13 necessary assistance.

14 “(d) The President shall designate one of the members
15 of the Advisory Committee as the Chairman and one of the
16 members as the Vice Chairman. The Vice Chairman shall
17 act as Chairman in the absence or incapacity of, or in the
18 event of a vacancy in the office of, the Chairman.

19 “(e) The Advisory Committee shall provide continuing
20 review of the progress of the Nation in achieving objectives
21 set forth in section 102 (a), and shall advise the Adminis-
22 trator in carrying out his activities under this title. The Ad-
23 visory Committee shall submit a comprehensive biennial re-
24 port to the President and to the Congress on the status of the
25 Nation’s marine and atmospheric activities and may submit

1 other reports from time to time on such matters as it deems
2 appropriate.

3 “(f) Members of the Advisory Committee shall, while
4 serving on business of such Committee, be entitled to receive
5 compensation at rates not to exceed \$100 per diem, includ-
6 ing traveltime and while so serving away from their homes
7 or regular places of business, they may be allowed travel
8 expenses, including per diem in lieu of subsistence, in the
9 same manner as the expenses authorized by section 5703 (b)
10 of title 5, United States Code, for persons in Government
11 service employed intermittently.

12 “(g) The Administrator shall make available to the Ad-
13 visory Committee such staff, information, and other assist-
14 ance as it may require to carry out its activities.

15 “DEFINITIONS

16 “SEC. 107. As used in this title—

17 “(1) the term ‘marine environment’ includes—

18 “(A) the oceans;

19 “(B) the Great Lakes;

20 “(C) the seabed and subsoil of the submarine
21 areas thereof; and

22 “(D) the resources thereof;

23 “(2) .”

24 SEC. 2. (a) (1) The Coast Guard is hereby transferred

1 to the National Oceanic and Atmospheric Agency (hereafter
2 referred to in this section as the "Agency"), and there are
3 hereby transferred to and vested in the Administrator of the
4 Agency (hereafter referred to in this section as the "Admin-
5 istrator"), all functions, powers, and duties, relating to the
6 Coast Guard, of the Secretary of Transportation and of other
7 officers and offices of the Department of Transportation.

8 (2) Notwithstanding the transfer of the Coast Guard
9 to the Agency and the transfer to the Administrator of the
10 functions, powers, and duties, relating to the Coast Guard,
11 of the Secretary of Transportation and of other officers and
12 offices of the Department of Transportation, effected by the
13 provisions of paragraph (1) of this subsection, the Coast
14 Guard, together with the functions, powers, and duties re-
15 lating thereto, shall operate as a part of the Navy, subject to
16 the orders of the Secretary of the Navy, in time of war or
17 when the President shall so direct, as provided in section 3
18 of title 14, United States Code.

19 (3) Notwithstanding any other provision of this title,
20 the functions, powers, and duties of the General Counsel
21 of the Department of Transportation set out in chapter 47
22 (Uniform Code of Military Justice) of title 10, United States
23 Code, are hereby transferred to and vested in the General
24 Counsel of the Agency.

25 (b) The Environmental Science Services Administra-

tion is hereby transferred to the Agency, and there are hereby transferred to and vested in the Administrator all functions, powers, and duties, relating to the Environmental Science Services Administration, of the Secretary of Commerce and of other officers and offices of the Department of Commerce.

(c) The Bureau of Commercial Fisheries is hereby transferred to the Agency, and there are hereby transferred to and vested in the Administrator all functions, powers, and duties, relating to the Bureau of Commercial Fisheries, of the Secretary of the Interior and of other officers and offices of the Department of the Interior.

(d) There are hereby transferred to and vested in the Administrator all functions, powers and duties of the Bureau of Sport Fisheries and Wildlife, and of the Secretary of the Interior and of other officers and offices of the Bureau, under the Act of August 8, 1956 (70 Stat. 1119, 16 U.S.C. 742), with respect to marine and anadromous fisheries programs.

(e) The mission (except with respect to cartographic compilation work for the Army Map Service) assigned as of July 1, 1969, to the United States Army Engineer District, Lake Survey, Corps of Engineers, Department of the Army, is hereby transferred to the Agency; and there are hereby transferred to and vested in the Administrator all

1 functions, powers and duties, relating to such mission, of the
2 Secretary of the Army and of other officers and offices of the
3 Department of the Army.

4 (f) There are hereby transferred to and vested in the
5 Administrator all functions, powers and duties of the Secre-
6 tary of the Navy, and other officers and offices in the Depart-
7 ment of the Navy, with respect to the operation of the Na-
8 tional Oceanographic Data Center.

9 (g) So much of the positions, personnel, assets, liabili-
10 ties, contracts, property, records, employed, held, used,
11 arising from, available or to be made available in connection
12 with the functions, powers, and duties transferred by this sec-
13 tion and section 3 of this Act as the Director of the Bureau
14 of the Budget shall determine shall be transferred to the
15 Administrator. Any personnel engaged in functions, powers,
16 and duties transferred under this section and section 3 of this
17 Act shall be transferred in accordance with applicable laws
18 and regulations relating to transfer of functions; except that
19 the transfer of personnel pursuant to such sections shall be
20 without reduction in classification or compensation for one
21 year after such transfer.

22 (h) In exercising the functions, powers and duties
23 transferred to him under this section, the Administrator shall
24 give full consideration to the need for operational continuity
25 of the functions so transferred.

21

1 SEC. 3. (a) (1) Section 203 (a) of the National Sea
2 Grant College and Program Act of 1966 is amended by
3 striking out “National Science Foundation (hereinafter in
4 this title referred to as the ‘Foundation’)” and inserting in
5 lieu thereof “Administrator of the National Oceanic and
6 Atmospheric Agency (hereafter in this title referred to as
7 the ‘Administrator’)”.

8 (2) Paragraph (1) of section 203 (b) of such Act is
9 amended by striking out “Foundation” and inserting in lieu
10 thereof “National Oceanic and Atmospheric Agency”.

11 (b) (1) Subsection (a) of section 204 of such Act is
12 amended by striking out “Foundation” and inserting in lieu
13 thereof “Administrator”, by striking out “(1)”, and by
14 striking out “, and (2) seek advice” and all that follows
15 thereafter and inserting in lieu thereof a period.

16 (2) Subsection (b) of such section 204 is amended
17 by striking out “Foundation shall exercise its authority”
18 and inserting in lieu thereof “Administrator shall exercise
19 his authority”.

20 (3) Subsections (d) (1), (d) (2), (e), (h), and
21 (i) (4) of such section 204 are each amended by striking
22 out “Foundation” each place it appears and inserting in lieu
23 thereof “Administrator”.

24 (4) Subsection (d) (3) of such section 204 is amended
25 by striking out “Foundation” the first place it appears and

1 inserting in lieu thereof “Administrator”, and by striking
2 out “Foundation” the second place it appears and inserting
3 in lieu thereof “National Oceanic and Atmospheric Agency”.

4 (5) Subsection (f) of such section 204 is amended by
5 striking out “its functions under this title, the Foundation”
6 and inserting in lieu thereof “his functions under this title,
7 the Administrator”.

8 (6) Subsection (g) of such section 204 is repealed.

9 (c) Section 205 of such Act is repealed.

10 SEC. 4. (a) Subchapter II (relating to executive pay
11 schedules) of chapter 53 of title 5, United States Code, is
12 amended as follows:

13 (1) Section 5313 is amended by adding at the end
14 thereof the following:

15 “(20) Administrator, National Oceanic and Atmos-
16 pheric Agency.”

17 (2) Section 5314 is amended by adding at the end
18 thereof the following:

19 “(54) Deputy Administrator, National Oceanic and
20 Atmospheric Agency.”

21 (3) Section 5315 is amended by adding at the end
22 thereof the following:

23 “(92) General Counsel, National Oceanic and
24 Atmospheric Agency.”

25 (b) Paragraph (1) of section 801 of title 10, United

1 States Code, is amended by striking out “the General
2 Counsel of the Department of Transportation” and inserting
3 in lieu thereof “the General Counsel of the National Oceanic
4 and Atmospheric Agency”.

5 SEC. 5. (a) All orders, determinations, rules, regula-
6 tions, permits, contracts, certificates, licenses, and privileges—

7 (1) which have been issued, made, granted, or
8 allowed to become effective—

9 (A) under any provision of law amended by
10 this Act, or

11 (B) in the exercise of duties, powers, or func-
12 tions which are transferred under this Act,

13 by (i) any department or agency, any functions of
14 which are transferred by this Act, or (ii) any court
15 of competent jurisdiction, and

16 (2) which are in effect at the time this Act takes
17 effect,

18 shall continue in effect according to their terms until modi-
19 fied, terminated, superseded, set aside, or repealed by the
20 Administrator or General Counsel (in the exercise of any
21 authority respectively vested in them by this Act) of the
22 National Oceanic and Atmospheric Agency (hereafter re-
23 ferred to in this section as the “Agency”), by any court of
24 competent jurisdiction, or by operation of law.

1 (b) The provisions of this Act shall not affect any pro-
2 ceedings pending at the time this section takes effect before
3 any department or agency (or component thereof), the func-
4 tions of which are transferred by this Act; but such proceed-
5 ings, to the extent that they relate to functions so transferred,
6 shall be continued before the Agency. Such proceedings, to
7 the extent they do not relate to functions so transferred,
8 shall be continued before the department or agency before
9 which they were pending at the time of such transfer. In
10 either case, orders shall be issued in such proceedings, ap-
11 peals shall be taken therefrom, and payments shall be made
12 pursuant to such orders, as if this Act had not been enacted;
13 and orders issued in any such proceedings shall continue
14 in effect until modified, terminated, superseded, or repealed
15 by the Administrator or General Counsel (in the exercise
16 of any authority respectively vested in them by this Act),
17 by a court of competent jurisdiction, or by operation of law.

18 (c) (1) Except as provided in paragraph (2) —

19 (A) the provisions of this Act shall not affect suits
20 commented prior to the date this section takes effect, and

21 (B) in all such suits proceedings shall be had, ap-
22 peals taken, and judgments rendered, in the same man-
23 ner and effect as if this Act had not been enacted.

24 No suit, action, or other proceeding commenced by or against
25 any officer in his official capacity as an officer of any depart-

25

1 ment or agency, the functions of which are transferred by
2 this Act, shall abate by reason of the enactment of this Act.
3 No cause of action by or against any department or agency,
4 functions of which are transferred by this Act, or by or against
5 any officer thereof in his official capacity shall abate by rea-
6 son of the enactment of this Act. Causes of actions, suits,
7 actions, or other proceedings may be asserted by or against
8 the United States or such official of the Department as may
9 be appropriate and, in any litigation pending when this
10 section takes effect, the court may at any time, on its own
11 motion or that of any party, enter an order which will give
12 effect to the provisions of this subsection.

13 (2) If before the date on which this Act takes effect,
14 any department or agency, or officer thereof in his official
15 capacity, is a party to a suit, and under this Act—

16 (A) such department or agency is transferred to
17 the Administrator, or

18 (B) any function of such department, agency, or
19 officer is transferred to the Administrator,

20 then such suit shall be continued by the Administrator (ex-
21 cept in the case of a suit not involving functions transferred
22 to the Administrator, in which case the suit shall be contin-
23 ued by the department, agency, or officer which was a party
24 to the suit prior to the effective date of this Act).

25 (d) With respect to any function, power, or duty trans-

26

1 ferred by this Act and exercised after the effective date of
2 this Act, reference in any other Federal law to any depart-
3 ment or agency, officer or office so transferred or functions
4 of which are so transferred shall be deemed to mean the
5 officer or agency in which this Act vests such function after
6 such transfer.

7 SEC. 6. The Administrator of the National Oceanic and
8 Atmospheric Agency is directed to submit to the Congress,
9 within two years from the effective date of this Act, a pro-
10 posed codification of all laws that contain the powers, duties,
11 and functions transferred to or vested in the Administrator or
12 the Agency by this Act.

13 SEC. 7. (a) This Act shall take effect ninety days after
14 the Administrator of the National Oceanic and Atmospheric
15 Agency first takes office, or on such prior date after enact-
16 ment of this Act as the President shall prescribe and publish
17 in the Federal Register.

18 (b) Any of the officers provided for in this Act may
19 (notwithstanding subsection (a)) be appointed in the
20 manner provided for in this Act, at any time after the date
21 of enactment of this Act. Such officers shall be compensated
22 from the date they first take office, at the rates provided
23 for in this Act. Such compensation and related expenses of
24 their offices shall be paid from funds available for the func-
25 tions to be transferred to the Agency pursuant to this Act.

U.S. ATOMIC ENERGY COMMISSION,
October 9, 1969.

HON. EDWARD A. GARMATZ,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. GARMATZ: The Atomic Energy Commission is pleased to respond to your letter of August 4, 1969, requesting our views on H.R. 13247, a bill "[t]o amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment."

We note that H.R. 3848, H.R. 4838 and H.R. 11240, introduced in the current session, are similar in that they propose the establishment of a "National Oceanic and Atmospheric Agency" (or a "National Oceanographic Agency") to achieve the objectives described in H.R. 13247.

H.R. 13247 is directed towards "a comprehensive coordinated and continuing national program in marine and atmospheric science, technology, and technical services." The objectives of the program would relate to the exploration, exploitation, control and utilization of the marine and atmospheric environments, including the development and advancement of technology, private investment, technical devices, education and training, and the utilization of national scientific and engineering resources. For this purpose, and to effectuate the objectives envisaged by the bill, there would be established as an independent agency, a "National Oceanic and Atmospheric Agency," headed by an Administrator. To this new agency there would be transferred the functions of various existing agencies, including the Coast Guard, the Environmental Science Services Administration, the Bureau of Commercial Fisheries and the National Oceanographic Data Center. The new Agency would be assisted in the performance of its statutory functions by a "National Advisory Committee for Oceans and Atmosphere," to be established under the bill.

We agree that it is desirable to have effective coordination of Federal activities in this field. We believe the bill reflects a feasible legislative implementation of the recommendations made by the Commission on Marine Sciences, Engineering and Resources in its recent comprehensive report covering a two-year study of the Nation's marine science activities. However, in my statement concerning this report, furnished to your Subcommittee on Oceanography on July 28, 1969, I indicated that "[t]he recommended reorganization of Federal marine-related activities . . . needs to be examined carefully in the broad context of Federal organization and program priorities." As you know, the President has asked his Advisory Council on Executive Organization to conduct such an examination. Accordingly, we believe that reorganization of marine science activities would be inappropriate at this time. In regard to AEC's programs, we believe that Section 2 of the bill is consistent with the following statement in the Commission's report:

"In considering the composition of the proposed National Oceanic and Atmospheric Agency, the Commission rejected the idea of consolidating all Federal marine and atmospheric functions into a single, massive organization. Some such functions which will remain outside NOAA are integral to the agency which performs them. Although they should be strengthened and should be fully utilized by NOAA, they are best left where they are. The National Aeronautics and Space Administration's (NASA) oceanography-from-space program and the Atomic Energy Commission's (AEC) various marine-related nuclear energy programs are examples, as are the strong marine programs of the Navy, the Corps of Engineers, the National Science Foundation, and the marine-related water management programs of the Department of the Interior." (p. 232)

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Cordially,

GLENN T. SEABORG, *Chairman.*

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., October 27, 1969.

HON. EDWARD A. GARMATZ,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in response to your request for the views of the Bureau of the Budget on H.R. 13247, a bill which would amend the Marine Resources and Engineering Development Act of 1966. The principal provisions of the bill are for the establishment of a new independent agency, the National Oceanic and Atmospheric Agency, and a National Advisory Committee for Oceans and Atmosphere. This bill would implement the recommendation of the Commission on Marine Science, Engineering and Resources with respect to Federal organization.

As you may know, the Administration has been carefully reviewing the Commission's recommendations for new and expanded programs in marine sciences. In addition, the President has asked his Advisory Council on Executive Organization to examine carefully the Commission's organizational proposals in the context of broader Federal organizational requirements. The President also asked that the Commission's proposals be compared with alternative ways of coordinating and advancing national development of the marine sciences.

We believe that action should not be taken to implement the Commission's organizational proposals until organizational requirements extending beyond those that could be considered by the Marine Commission are taken into account. In view of the President's assignment to his Advisory Council on Executive Organization, we will not be in a position to comment substantively on the Commission's organizational proposals at this time.

Accordingly, we recommend against enactment of H.R. 13247 at this time.

Sincerely yours,

WILFRED H. ROMMEL,
Assistant Director for Legislative Reference.

GENERAL COUNSEL OF THE DEPARTMENT OF COMMERCE,
Washington, D.C., October 6, 1969.

HON. EDWARD A. GARMATZ,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request for the views of this Department concerning H. R. 13247, a bill "to amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment."

On September 23, 1969, Assistant Secretary of Commerce Myron Tribus testified before the Subcommittee on Oceanography of your Committee with respect to H.R. 13247 and the Report of the Commission on Marine Sciences, Engineering and Resources. A copy of his testimony is enclosed.*

The views expressed by Dr. Tribus at that hearing set forth the position of the Department of Commerce with respect to H.R. 13247.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of this letter to your Committee.

Sincerely,

JAMES T. LYNN, *General Counsel.*

*See testimony of Mr. Tribus.

DEPARTMENT OF THE NAVY,
OFFICE OF LEGISLATIVE AFFAIRS,
Washington, D.C., September 24, 1969.

HON. EDWARD A. GARMATZ,
Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: Your request for comment on H.R. 13247, a bill "To amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment," has been assigned to this Department by the Secretary of Defense for the preparation of a report thereon expressing the views of the Department of Defense.

The bill would establish a new independent agency to be known as the National Oceanic and Atmospheric Agency. This Agency, under the direction of the President, would undertake the leadership for the planning, direction, conduct and support of all federal civil marine and atmospheric affairs, including the Great Lakes as well as the oceans. Several federal organizations would be transferred from their present locations to form the Agency. The proposed transfers most immediately affecting the Department of Defense would include the National Oceanographic Data Center under the administration of the Department of the Navy and the Lake Survey of the Corps of Engineers, Department of the Army. In addition, the bill would establish a fifteen member Presidentially appointed National Advisory Committee for the Oceans and Atmosphere. The Advisory Committee would provide a link between federal, state and local governments, industry, and university components of the national ocean-oriented community. The Advisory Committee would review the progress in achieving the nation's oceanic and atmospheric objectives, and report to the President and the Congress, while at the same time being primary advisor to the National Oceanic and Atmospheric Agency. Provision is also made for the representatives of other government agencies concerned with oceanic and atmospheric affairs to act as observers on the Advisory Committee.

The bill focuses upon the reorganization of the Federal Government's civil responsibilities for oceanic and atmospheric affairs and embodies many of the organizational recommendations of the report of the Commission on Marine Science, Engineering and Resources entitled "Our Nation and the Sea." On 19 May 1969, the President referred the Commission report to the President's Advisory Council on Executive Organization and asked the Council to review the organization recommendations made by the Commission.

In light of the above Presidential action, it would be inappropriate at this time for the Department of Defense to express a position for or against enactment of the bill. However, the Department does subscribe to the following general views on the matter and offers them for the consideration of the Committee.

The Department of Defense has viewed the proposal in terms of four major domains in which the new organization is proposed to operate—the World Ocean, the World Atmosphere, the Coastal Zone and the Great Lakes.

Although the Department of Defense believes a new agency is not required for the coastal zone, should a new agency be created to meet the needs of the World Ocean and the World Atmosphere it would have an obvious interest in the coast. The Department believes that the best way for such an agency to influence coastal decisions, would be for it to join, not duplicate or displace, the Water Resources Council and the Federal-interstate field organizations now working actively with it.

The Department has considered the essentially inland character of these lakes and the role of the principal Federal-interstate mechanism existing there—the Great Lakes Basin Commission. Regardless of the decision establishing the proposed agency, an oceanic agency should not have a primary role on the Great Lakes. These problems are not primarily oceanic in character. In their hydraulic, biologic, water quality and legal aspects they are much more closely related to rivers and inland lakes than they are to the World Ocean. Thus, with respect to the U.S. Army Engineer District, Lake Survey, the proposed transfer to the new oceanic and atmospheric agency would not appear to be advisable considering the basic inland nature of these lakes.

Should some form of reorganization of the Federal civil oceanic and atmospheric effort be accomplished, it is of paramount importance that a maximum

degree of cooperation and coordination be maintained with all ongoing efforts in this area including those of the military services. It would certainly be the intention of the Department of Defense to continue to work with any new agency established, just as actively as has been done in the past.

The proposed transfer of the National Oceanographic Data Center to the National Oceanic Agency by the bill is noted. The National Oceanographic Data Center is currently under the administrative management of the Naval Oceanographic Office and is supported by funds from 10 departments and agencies. Its technical programs and policies are established and reviewed by an interagency advisory board consisting of the representatives of these sponsoring agencies. The Data Center serves as a central repository for the nation's unclassified oceanographic data. In addition to its chartered mission, the Data Center is also designated as an oceanographic information and analysis center for the Department of Defense to provide service to users within the Department of Defense. The importance of the Data Center as an adjunct to the military mission is evidenced by the major role Navy has played to support the Center, and by the fact that Navy and Navy contractors are the major users. The Department of Defense would not object to the transfer of the Data Center if the new organizational arrangement was supportive of its national charter. We believe the Data Center would be expected to continue to provide data services to all users, government and private, civilian and military, in keeping with its basic mandate as a national data repository.

With regard to the National Advisory Committee for Oceans and Atmosphere proposed by the bill, there are two features concerning which the Department of Defense has serious reservations. The first is that the mechanism suggested for the Advisory Committee would appear to put the proposed operating agency, the National Oceanic and Atmospheric Agency and its advisory group, the Advisory Committee for Oceans and Atmosphere, in an effectively controlling position over other operating agencies with their own special mission requirements. This appears likely to generate conflicts that would tend to give the Advisory Committee an unwarranted amount of bias toward the National Oceanic and Atmospheric Agency as opposed to the equally vital interests of other federal agencies. Second, the bill provides for participation by federal agency representatives on the Advisory Committee only by relegating them to observer status. The Department of Defense believes that such an arrangement could severely jeopardize the Advisory Committee's effectiveness as the principal governmental advisory group for the nation's marine and atmospheric activities.

It is noted that the National Oceanic and Atmospheric Agency would function in the conduct of mapping and charting, encompassing the world oceans. The Department of the Navy has statutory responsibility for the provision of accurate charts, sailing directions and manuals for the use of all vessels of the United States and for the benefit and use of all navigators generally, although its primary concern is with defense requirements and in the deep oceans around the world. The U.S. Army Engineer District, Lake Survey, has a generally similar role on the Great Lakes. The Environmental Science Services Administration, a proposed component of the new National Oceanic and Atmospheric Agency, would be concerned primarily with civil mapping and charting activities which are confined largely to the U.S. territorial waters and the continental shelf areas. Care should be exercised to insure that mapping and charting responsibilities are clear in order to avoid unnecessary duplication of effort.

Also, care should be exercised to insure that the lines of responsibility or function between the proposed National Oceanic and Atmospheric Agency and the Department of Defense would be clearly delineated.

H.R. 13247 proposes further that the testing and calibration of instruments are functions assigned to the National Oceanic and Atmospheric Agency. This would appear to duplicate work being done by the Navy's National Oceanographic Instrumentation Center. The Center is under the administrative control of the Commander, Naval Oceanographic Office and guided by an advisory board representing fifteen interested agencies. The Center's mission is to serve as the national focal point for knowledge of technology related to testing, evaluation, and calibration of sensing systems for ocean use, to enhance the quality of such systems by the dissemination of operational results and technical information, in order to serve the national oceanographic community. However, broader national benefits might result from incorporation of this Center into the proposed National Oceanic and Atmospheric Agency.

The bill would transfer the U.S. Coast Guard from the Department of Transportation to the proposed agency with the proviso that the Coast Guard shall operate as a part of the Navy in time of war or when the President shall so direct. However, it is the concern of the Department of Defense that the Coast Guard may not be maintained in an adequate state of readiness as a member of the Armed Forces of the United States if its forces are "combined" with the other elements of the proposed agency as recommended by the Commission on Marine Science, Engineering and Resources. The requirement to so maintain the Coast Guard as provided by 14 U.S.C. 2 for transfer to the Department of Defense as provided by 14 U.S.C. 3 is mandatory.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.

The Bureau of the Budget advises that, from the standpoint of the Administration's program, there is no objection to the presentation of this report on H.R. 13247 for the consideration of the Committee.

For the Secretary of the Navy.

Sincerely yours,

MEANS JOHNSTON, Jr.,
Rear Admiral, USN, Chief of Legislative Affairs.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
October 14, 1969.

HON. EDWARD A. GARMATZ,
Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your request of August 4, 1969, for our views on H.R. 13247, a bill "To amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment."

This bill would provide for a new independent agency in the Executive Branch to be known as the National Oceanic and Atmospheric Agency. The bill prescribes the functions and powers of the new agency and in addition provides for establishment of a 15-member National Advisory Committee for Oceans and Atmosphere.

The following government departments and agencies and their functions would be transferred to the new agency: The Coast Guard; The Environmental Science Services Administration; The Bureau of Commercial Fisheries; The Bureau of Sport Fisheries and Wildlife; the mission of July 1, 1969, assigned to the U.S. Army Engineer District, Lake Survey, Corps of Engineers, Department of the Army (respecting deterioration of the quality of Lake Erie and the other Great Lakes); and the duties of the Secretary of the Navy with respect to the National Oceanographic Data Center.

While the bill provides for activities in the atmospheric sciences area, it does not relate directly to air pollution control or other environmental health programs administered by the Department. Accordingly, the Department of Health, Education, and Welfare defers to the views of those departments more directly concerned with the subject matter of H.R. 13247.

We are advised by the Bureau of the Budget that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely,

ROBERT H. FINCH, Secretary.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., September 23, 1969.

HON. EDWARD A. GARMATZ,
Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: Your Committee has requested the views of this Department on H.R. 13247, a bill "To amend the Marine Resources and Engineering

Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment."

We recommend that the bill not be enacted.

H.R. 13247 would provide for the creation of a new Federal agency, the National Oceanic and Atmospheric Agency, to serve as a principal instrumentality in the Federal Government for administration and coordination of civil marine and atmospheric programs. It would also provide for an advisory commission, the National Advisory Commission for Oceans and Atmosphere, to review continuously and make recommendations to the President and Congress on the status of these programs. This proposal follows closely the recommendations contained in chapter 7 of the January 1969 publication, *Our Nation and the Sea*, a report of the Commission on Marine Science, Engineering and Resources.

With respect to the report's organizational recommendations, President Nixon on May 19, 1969, requested the Advisory Council on Executive Organization to examine carefully the Commission's proposal in the broad context of Federal organization. Part of President Nixon's request to the Advisory Council on Executive Organization was to compare the Commission's proposals with alternate ways for coordinating and advancing national development of marine sciences. Therefore, we believe that any attempt to create a new independent agency that would include all civilian marine and atmospheric activities is premature at this time. No such legislation would seem appropriate until the Advisory Council on Executive Organization has completed its study and presented its findings to the President.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely yours,

RUSSELL E. TRAIN,
Under Secretary of the Interior.

NATIONAL SCIENCE FOUNDATION,
OFFICE OF THE DIRECTOR,
Washington, D.C., October 21, 1969.

HON. EDWARD A. GARMATZ,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your letter of August 4, 1969, for comments on H.R. 13247, "To amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment."

The comments of the National Science Foundation are set forth in my testimony on the bill, delivered to the Subcommittee on Oceanography of the Committee on Merchant Marine and Fisheries on October 1, 1969.

Sincerely yours,

W. D. McELROY, *Director.*

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, D.C., October 20, 1969.

HON. EDWARD A. GARMATZ,
Chairman, Committee on Merchant Marine and Fisheries, U.S. House of Representatives, Washington, D.C.

DEAR MR. GARMATZ: I very much appreciate the opportunity to present my views on H.R. 13247, the National Oceanic and Atmospheric Program Act of 1969. As you know, I shall testify on this bill before your Committee on October 21, and will provide you with a full presentation of my opinions on that occasion. A copy of my prepared statement is attached.

The central feature of the bill is the proposed establishment of an independent agency in the Executive Branch to carry out a broad range of functions affecting the marine and atmospheric environment. The bill would implement the organizational recommendations of the report of the Commission on Marine Science, Engineering and Resources.

The Commission's proposal for a new organization has important implications for Federal organization for objectives other than marine science. The President has requested his Advisory Council on Executive Organization (the Ash Council) to consider the Commission's proposal for a new agency in the context of broader Federal organization requirements. Pending the results of this review, I would recommend against enactment of H.R. 13247.

The new Administration has devoted considerable thought to the wisest ways to employ the resources of the Federal Government to deal with the environmental problems. H.R. 13247 is concerned with Federal activities and capabilities in the marine and atmospheric environment, which are important but limited parts of our physical and biological environment.

As I will explain in greater detail in my personal appearance before you, it is quite possible that the existence of a National Oceanic and Atmospheric Agency would limit the flexibility needed to pursue other kinds of regroupings of agency functions to pursue environmental objectives, or could adversely affect the capabilities of Federal agencies to carry out existing statutory responsibilities in other areas.

Moreover, from a scientific standpoint, while there is a sound argument for linking together the oceans and the atmosphere, there is an equally sound argument for linking the solid earth and the oceans together, or the solid earth and the atmosphere together. Weather is modified in equally important ways by the ocean-atmosphere interaction and by the accidents of locations of continental land masses and their topography. I think it would be unfortunate if in linking together the Federal scientific activities embracing the oceans and the atmosphere they were to be placed in competition with those involving land based science.

I would like to underscore my belief that the oceans represent a great opportunity for this country. They are an important element in our national security and a vital part of our human environment. Thus, it is important that we make the most effective use of those monies spent on marine resources and development so that our marine science and technology activities move vigorously to enlarge our understanding of the marine environment. While there has been considerable growth in these activities in recent years, much remains to be done. I will continue to direct my efforts toward supporting vigorous efforts in the marine sciences as an integral part of our general effort to improve the quality of the human environment.

The Bureau of the Budget has advised that there is no objection to the submission of this report from the standpoint of the Administration's program.

Sincerely,

LEE A. DuBRIDGE, *Director.*

SMITHSONIAN INSTITUTION,
Washington, D.C., October 1, 1969.

HON. EDWARD A. GARMATZ,
Chairman, Committee on Merchant Marine and Fisheries,
U.S. House of Representatives, Washington, D.C.

DEAR MR. GARMATZ: Thank you for your request to comment on H.R. 13247, a bill to amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration, and utilization with respect to our marine and atmospheric environment. To fulfill such a program, the bill would establish an independent National Oceanic and Atmospheric Agency and a National Advisory Committee for Oceans and Atmosphere.

The bill incorporates the reorganization recommendations of the Commission on Marine Science, Engineering and Resources, in whose report there is a call for "a new central focus of strength" for national marine programs. The Commission's report also singled out the Smithsonian as one of the establishments that "should maintain their identities and be strengthened further as essential contributors to the national marine effort." We agree fully with the Commission's comments about the Smithsonian and have consistently attempted to strengthen our oceanic programs.

Inasmuch as the Smithsonian is a scientific organization, we are not in a position to comment on the proposed agency reorganization, particularly in light of the pending review and recommendations of the Ash Council.

Thank you for this opportunity to comment on the bill. The Bureau of the Budget advises that there is no objection to this report from the point of view of the Administration's program.

Sincerely yours,

S. DILLON RIPLEY, *Secretary.*

DEPARTMENT OF STATE,
Washington, D.C., October 10, 1969.

Hon. EDWARD A. GARMATZ,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: Your letter of August 4, 1969, forwarded a copy of H.R. 13247, "A Bill to amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment" and asked for our views and recommendations on this proposed legislation.

The Administration has requested M. Roy Ash, Chairman of the newly established Advisory Council on Executive Organization, to place high on the Council's agenda of matters to be studied the proposal for the creation of a new, independent oceanographic and atmospheric agency. This is to be examined carefully in the context of broader federal organizational requirements. In studying this matter the Council will consider related environmental and natural resource problems and compare the proposal for the establishment of a new agency with alternative ways of coordinating and advancing national development of the marine sciences. Pending completion of the Council study, the Department would prefer not to comment or suggest recommendations on the proposed legislation.

The Bureau of the Budget advises that from the standpoint of the Administration's program there is no objection to the submission of this report.

Sincerely yours,

H. G. TORBERT, Jr.,
Acting Assistant Secretary for Congressional Relations.

Mr. LENNON. Today we are honored to have with us two most distinguished gentlemen—our distinguished colleague from the Senate, the Honorable Claiborne Pell, and Mr. Norcutt Ely, of Ely & Duncan, Washington, D.C., who has been most active with the bar association and International Law Association in these matters. We will be pleased to hear first from our distinguished colleague, Senator Pell, who, as we know, is chairman of the Senate Foreign Relations Subcommittee on Ocean Space, and has maintained an interest in all phases of ocean activity.

Senator, if you will come forward, we are delighted and honored to have you, knowing of your long-time interest and concern in the matters that we are now faced with.

You may proceed, sir.

STATEMENT OF HON. CLAIBORNE PELL, A U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator PELL. Thank you very much, Mr. Chairman, for letting me come over here and expose some of my own thinking and views.

Congressman Garmatz, the chairman of the full committee, thank you for being here, and members of the committee. I am particularly glad to be here because I think we all are working together in trying to move ahead in this field of oceanology in developing our national abilities and potentials.

The current hearings that you are conducting, which are of great interest to all of us on our side of the Hill, on the report of the Com-

mission on Marine Sciences, Engineering, and Resources are a very valuable contribution.

I would like to make it clear at the outset that I consider the report of the Commission to be in itself an outstanding accomplishment. I am glad, for instance, that the House of Representatives has reprinted the basic Commission report. I regret that the panel reports are becoming scarcer than hen's teeth to get, and we find on our side that it is very difficult to secure them. I have been thinking of having one or two of them printed as Senate documents if we can.

It would be exceedingly difficult, I think, to find another study commission that has executed its assignment in such a thorough and comprehensive manner.

This is not to say that I would agree with each and every recommendation of the Commission. But in general I do give it my hearty support and congratulate you, Mr. Chairman and the members of your committee, on your legislation which seeks to move ahead in the direction of the Commission report and translate its recommendations into specific legislative proposals, an intellectual exercise that is much needed.

We in the Congress are considering this report in the midst of a renewed public interest and enthusiasm in the exploration of outer space, prompted by the dazzling success of Apollo. I, too, have been deeply impressed, even awed, at this magnificent achievement.

I would not venture to enter the competition in seeking for appropriate adjectives to describe the first extraterrestrial visit by man. I would simply say it is historic.

But I was struck recently by the historic context in which the space program was placed by Mr. Peter F. Drucker in his very perceptive book, "The Age of Discontinuity."

Searching for historical precedents, Mr. Drucker recalled that ancient Egypt some 7,000 years ago produced two truly historic achievements—the building of the first pyramid, and the invention of the plow. The building of the pyramid had a profound philosophical impact on man, but it was the invention of the plow, by increasing agricultural productivity, that virtually restructured human society.

And then Mr. Drucker expressed the opinion that in our age, "space exploration is our 'pyramids' and the exploration of the oceans our 'plow.'"

And I would hope that we would not only continue but expand our emphasis on the "plow."

I believe that the Marine Sciences Commission has provided us with a plan as to how we can best move ahead. Perhaps the most impressive recommendation of the report is that a single agency whatever its name, and whatever existing agencies of the Government are included, is obviously necessary.

Some of you may be familiar with the book that Mr. Harold L. Goodwin and I wrote a couple of years ago in which, by a strange coincidence, we said that an agency called NOAH, although we had different actual initials than the NOAA recommended by the commission, should be developed, and your committee is doing a great deal in moving ahead in this direction.

I think there can be no question that, as the Commission recom-

mended, we must increase our funding of our national oceanologic programs. The only question in my mind is whether the Commission's proposal for a doubling of present expenditure levels during the next decade is not too modest. Personally I think it is.

As the coauthor with Congressman Rogers of the Sea Grant College Act of 1966, I am gratified at the recognition given to the program in the Commission report. Specifically, the proposal for establishment of coastal zone laboratories, under the administration of the Sea Grant College program, is, I believe, an excellent one.

I must add here that, speaking personally, I have some reservations concerning the thought of moving ahead too hard on the regional centers which can tend to dominate the various smaller centers of excellence we want to see developed around the country.

Mr. Chairman, I cannot attempt here to comment on each of the Commission recommendations, including the Sea Grant College bills on which Congressman Rogers and I have been working together. But I would note two recommendations that would be implemented by legislation now pending in the Senate.

First, I have introduced in the Senate S. 2230, removing the existing restriction on use of foreign-built fishing vessels by our commercial fishermen, as recommended by the Commission.

Needless to say, this is not a bill popular in shipbuilding States or areas, but it would seem to me a worthwhile bill since it would reduce the capital costs for many of our fishermen by a third to half in getting their basic vessels.

Second, I have cosponsored S. 1588, introduced by Senator Warren G. Magnuson, who has in our body always taken the lead in everything to do with the oceans and is most interested in them and has helped me tremendously in what small work I have done in this regard. This bill would establish an Institute of Marine Pharmacology in the National Institutes of Health, an action also recommended by the Commission.

Both of these actions, I think, are worthwhile steps which could help move us along and need not wait on any overall action in connection with the broad thrust of the Commission's report.

Now turning to the report of the international panel, with which as a member of the Foreign Relations Committee I have been particularly concerned, the Commission said basically that this country's national interest in terms of the development and utilization of the ocean space environment demands that we take the lead in (1) limiting coastal State jurisdiction over the natural resources of the Continental Shelf to a depth of 200 meters or a distance of 50 nautical miles, and (2) defining a multilateral legal and political framework for purposes of mineral resource exploitation beyond the regime of the Continental Shelf.

In addressing this later issue, the Commission recommended that such a framework encompass the following provisions: an international registry authority, with limited policing functions; an international fund to be used for agreed-upon worldwide community objectives; an agreement as to the powers and duties of registering nations; an arrangement for the settlement of disputes; and provision for an intermediate zone, over which the adjacent coastal State would have a veto power as to who may exploit the resources of the zone,

In making these recommendations and in urging that the United States take the lead in trying to resolve these very intricate and complex issues, the Marine Commission issued a warning to the effect that:

Unless a new international framework is devised which removes the legal uncertainty from mineral resource exploration and exploitation in every area of the seabed and subsoil, some venturesome governments and private entrepreneurs will act to create *fait accomplis* that will be difficult to undo, even though they adversely affect the interests of the United States and the international community.

Mr. Chairman, having devoted a good deal of my own time and effort over the last several years to attempting to grapple with the Outer Continental Shelf boundary issue and the question of an international legal and political framework for the exploitation of deep-sea mineral resources, I firmly believe that the recommendations of the Marine Commission strike the proper sense of urgency with regard to U.S. policy requirements, and in our national interest.

As this committee knows, and in fact I took the liberty of sending each member a copy, I have reintroduced in the Senate legislation, Senate Resolution 33, calling upon the President to have tabled before the United Nations Committee on the Peaceful Uses of the Seabed, which begins its next meeting August 11, a specific set of legal principles for governing the use of ocean space, and I am pleased to note that a companion resolution has been introduced in the House by Congressman Gallagher, chairman of the Subcommittee on International Organizations and Movements of the Foreign Affairs Committee. I would hope that the members of this subcommittee, being familiar with this subject, would look with a favorable eye upon this legislation.

While this proposed legislation differs in some detail with the suggestions made by the Marine Commission, its general thrust and orientation are precisely in accord with the Commission's observations and recommendations: The United States can no longer delay in facing up to the tough political decisions involved in the ocean space question. The most urgent of these decisions relates to the Outer Continental Shelf boundary, or the extent of coastal State jurisdiction over offshore mineral resources.

In discussing the boundary issue, Mr. Chairman, I hope this committee will keep in mind two very important considerations: (1) the United States has but 10 percent of the world's Continental Shelf area; 90 percent of it is outside the shores adjoining or adjacent to the United States; and (2) our country is the recognized leader in the field of applied marine technology.

To me both of these factors mean that it is very much to our own national interest to limit coastal authority, in order to take advantage of our technological superiority and to be able to apply it to the largest international zone possible. I am convinced that such an arrangement would be acceptable to the international community, so long as the United States and the other developed countries agreed to the kind of international fund recommended along the lines of the Marine Commission.

For the benefit of this committee, I think it should be noted that the Senate Subcommittee on Ocean Space, of which I am chairman, has

just concluded 4 days of rather intensive hearings on these international issues. The subcommittee heard from a variety of witnesses, including representatives from the oceanographic, mining, fisheries, and petroleum industries; we also listened to experts in the fields of arms control, international law, and foreign relations.

Here I think it important to point out that, with the single exception of the petroleum industry, all of the subcommittee's witnesses testified that the United States must do everything in its power to secure as soon as possible a meaningful multilateral agreement on the ocean space issue.

With some of our Government agencies acting as lawyers on behalf of particular interests, with Commerce and Interior following the interests of the oil industry, and with the Defense Department having its problems, it is interesting to note that the State Department is really without a policy on this issue at present, and is even reluctant to state categorically that this matter must be settled by an international arrangement.

In fact our present policy today is a no-policy policy. I might point out, however, that Dr. G. Warren Nutter, Assistant Secretary of Defense for International Security Affairs, testified before the Subcommittee on Ocean Space that such an arrangement is mandatory and that the United States must proceed with all deliberate speed on this matter. My best guess is that this whole question, having proved a little too hot to handle by the Department of State, is now on its way for decision by the White House or the National Security Council.

In conclusion, Mr. Chairman, I hope that this committee will use its power and influence to see to it that President Nixon's administration lives up to its promise of providing leadership in defining a regime for the deep ocean floor. In the meantime, I fully endorse the suggestion that, through the United Nations, this country should seek a moratorium on claims of national jurisdiction beyond the 200-meter isobath.

Now, there are two further points here that I would like to leave with this committee, and I am sure that they are self-evident, but one has to look at what the reasons are for a particular policy or viewpoint.

The mining industry, and by this I mean the hard minerals industry, came before our subcommittee and argued strongly for some form of international regime. Mr. Wilkey, the general counsel of Kennecott Copper, had very specific testimony in this regard. I have been trying to analyze in my own mind why the petroleum industry is so adamantly opposed to this idea and want national jurisdiction over the whole Continental Shelf all the way down to the ocean deep.

In this regard, the petroleum industry has done a wonderful job of semantic development in the last few years. When most of us went to college, the Continental Shelf was described as the surface of the land mass extending out into the oceans. But, in recent years we have gradually seen this concept, I think, transformed, perhaps through a repetitive process, into a much broader concept; namely the entire submerged portion of the continental land mass extending to the abysmal deep.

I firmly believe that the petroleum industry and industry in general would be much better off with an international authority in which we would probably play a very strong role, such as we play in the World

Bank, and in this way would then be in a position to look after our interests, including those of our businessmen.

Concerning the position of the petroleum, I must confess that the thought which goes through my mind, and I think it is very important to be laid on the table and I hope you will follow this thought in your line of questioning, is that I do believe the tax aspects play an important role. When a U.S. petroleum company operates in Saudi Arabia, for example, the total costs to the company are about 50 percent, of which, say, 15 percent is in royalties, and 35 percent in taxes to the Government of Saudi Arabia.

Under our tax codes the 15 percent is the normal expense taken for the cost of doing business. The other 35 percent which really is also a fee or a royalty is actually treated as a tax under our laws and is taken off as a credit, which means the U.S. taxpayer is financing either the oil company or the Government of Saudi Arabia, and I think that when you look at the fees that are charged, the total of 50 percent is inordinately high.

During our subcommittee's hearings, I expressed the thought that our industry was being raped, which the industry considered too strong, but 50 percent is a great deal to pay unless the major portion can be written off against their U.S. tax liability. If we had an international authority, I think 15 percent or 20 percent or 10 percent would seem about right and would be in accord with the fees that are charged by our own Interior Department, and if we had an international authority, we could make sure that this kind of fee would be established because we would have the muscle, the money, and the know-how that would make the authority work, just as we have considerable say in the policies of the World Bank.

If the time comes when we are not a world power, which I hope is long after all of us are gone, but history changes, my analysis would change accordingly. But I would think for the foreseeable future that we would be able to dominate any international authority, and it would be to the interests of our industry to have greater access to 90 percent of the world's continental shelves.

There are other tax considerations which I know you who are lawyers are more familiar with than I am, such as doing business through subsidiary corporations in which dealing with a particular nation the rules are all laid out under our tax code, and largely because these rules are established, I think there is a basic apprehension on the part of business, particularly the petroleum industry, to do business with an international authority.

They know how to do business with nations, but they are a little worried about inefficiency, and they have every right to be, based on the record of the United Nations. They don't know just what to expect.

Perhaps if between both our bodies we removed some of the tax preferences which the petroleum industry enjoys already, you would find also objection to the idea of such an authority. However, I would hope—and I am sure they hope that these preferences are not removed—we can still move ahead in formulating plans for an international authority.

There is another question here and that is the relationship between industry and individual nations, particularly the developing nations.

Because of the apprehension about dealing with an international body, some businessmen, I think, would prefer to deal with individual countries. Also, the officials of the developing countries in particular are sometimes more easily persuaded than officials of an international organization. In addition, businessmen are more accustomed to dealing on this basis. Yet businessmen have dealt with international authorities be it the IBRD, be it IMCO, or be it some other international agency. I think overall we have found that relations have worked out pretty well and that U.S. national and business interests have prospered, and this would happen in my view if we moved ahead in the direction which I have outlined.

Here I would like to bring in another point with regard to limitation of the Continental Shelf. I have recommended the idea of 550 meters or 50 miles. The reason for 550 meters is that, with the knowledge we have today, the edge of the shelf is not known to occur at a depth greater than 550 meters. As the committee knows, the edge of the Continental Shelf is the dividing line between the shelf proper and the continental slope.

With regard to the continental shelves of islands, I have sought to place a limitation on the size of any one shelf by stipulating that the total shelf area may not be larger than the land mass to which it appertains. This strikes me as a fair and reasonable limitation, and it eliminates the problem which might arise of continental shelves were delimited on the median-line approach, which would mean that a small island, such as San Pietro or the Falkland Islands, could claim a continental shelf area many times greater than its own size.

This is a commonsense thought or idea that I think makes so much sense that if repeated sufficiently might secure a degree of international acceptance.

I would welcome any questions.

Mr. LENNON. Thank you very much, Senator, for an informative and a most interesting statement.

The gentleman from Ohio, Mr. Mosher.

Mr. MOSHER. Mr. Chairman, I don't think any of us is surprised at the tenor of the Senator's remarks today because we have all known for a long time his profound interest in this subject, but it is great to have him here in person to say what he has said, and I think his comments that have just gone well beyond the printed testimony before us are particularly fascinating.

However, I suppose that this matter of the need for a new regime of the seas, even though this committee has to be extremely interested in this, is really outside our jurisdiction and a little bit beyond our immediate concerns in these hearings which have to do with H.R. 13247.

Therefore, to bring it back to that bill, I am delighted to have the Senator indicate his support for the creation of a new agency, whether it is NOAA as described in the Commission report or some modification of that. It is good to know of your support for that, Senator.

Is it a fair question—and maybe it isn't fair—to ask whether in the support you have indicated in your testimony here this morning for an organization such as NOAA, do you think you speak for a considerable sentiment over on your side? Do you think that if and when we get this proposal over there, it is going to have a friendly, positive reaction?

Senator PELL. Two comments on that. First as to my own support, as I said, I would not want to pin myself down to specifics. It is a general support of the concept of a single agency. I have not yet made up my own mind, for instance, on whether the Coast Guard should be included in NOAA. I think it probably belongs in the new agency, but my support for a new agency is general, and I am sure that as you move ahead in your hearings you will be refining the bill and adding amendments to it and improving it as you go.

I personally am strongly in support of the general approach that you have. Now, will my colleagues in the Senate be interested?

The tragedy, I think, in this whole area is that nobody is really interested in the problem except the concerned people and those of us who have made a special study of it. I can remember 2 years ago having a hearing in the Foreign Relations Committee and trying to get people to come up and testify on the question of an international regime. I do not mean to get off the subject, but it is of interest. We couldn't get industry to take a position. We couldn't get the Government to take a position.

You go around the world and talk to people and find that the interest in this area is not as great as it should be. I think that the proposals you have been making, your legislation suggestions, make so much sense that once we focus on them I don't see how we could help but move ahead.

I can't make a prediction now because I think very few people have thought about it.

Mr. MOSHER. I certainly agree with you that we who are interested in the oceans need a much larger and stronger constituency. I am inclined to think it is stronger than most people think. After all, I represent an inland congressional district, although it fronts on Lake Erie, and I consider that a coastal zone to some extent. But it is Midwest, and yet I am surprised at how popular this whole matter is, this whole interest in the oceans is great, even there. It has a lot of romance to it, and I think, as you suggest, when you talk about the pyramids and the plow, there is a readiness to believe out there in the Midwest that in the seas there is a potential return in terms of earthly uses and the struggles that man is going through to make a greater future, there is a much greater and more immediate return in the oceans than there is in space.

There is a lot of enthusiasm growing, and I think there is a constituency growing for the oceans.

Senator PELL. I pray that you are correct. I think many people feel exactly the way you do but, from the viewpoint of the media, I noticed that in the 4 days of hearings we conducted and it may have been a reflection on my own position in the community, we didn't get one mention in the national press, the New York Times, AP, UPI. I think you are doing better over here in getting it press attention, but so far the press does not find this a very sexy or exciting subject.

I would hope they change because when they change, I think that my colleagues will themselves become more seized with the issue.

Mr. MOSHER. I have been a smalltown newspaperman all my life and I don't think my profession necessarily always knows what the public is interested in.

With that comment, I will return the floor.

Mr. LENNON. Thank you, Mr. Mosher.

Mr. Rogers.

Mr. ROGERS. Of course, I am delighted to see our good friend and colleague from the other side here. Your leadership in this field has certainly contributed greatly to the entire advancement of our movement into the sea.

I share your concern about the lack of interest that we have seen develop in many areas. I am concerned about the lack of the capture of the vision of what we could do, I think, by the administration and I realize it is still early, but I am concerned that this has not really been grasped. It is a great potential for development and it has not gone as far as the administration.

I know my colleagues on this side are doing all that they can to try to encourage this because I think they see the potential of it and have since the beginning.

I think it is a first step. I wonder if you share this view that we should form this organization, but as a first step don't you think it is important for the Congress to go ahead and move without waiting for the executive in the organization of the ocean-related agencies into a single agency?

Senator PELL. I would agree with you. I think far more than we realize actions are taken as a result of congressional initiative. In the bill that you and I initiated, the sea grant college bill, we had, as you may recall, zero encouragement from the executive branch of Government and now it is one of the pearls in the diadem, a small pearl, a tiny pearl, of the past administration.

I would agree with you, and I think also by moving ahead we force the executive to focus on these problems themselves, and this is, I think, the basic point here.

If they do not come up with a decision, we must. I read with great interest the priorities that the Vice President as Chairman of the Marine Council enunciated, I think, in your district. They are excellent priorities, and I think we should keep going in those directions and, if it takes the Hill to implement those recommendations, then we must move.

Mr. ROGERS. This is my feeling. I think the Congress must go ahead with the initiative here and try to hold this together. I think that is what the intention of this committee is, as the chairman has said.

Senator PELL. There is a basic jurisdictional problem here as we are all aware because the subject impinges on different committees. In our body, the Interior and the Foreign Relations and Defense and Commerce are interested. That is what you have here.

Mr. ROGERS. Yes. That is why I think we need to go ahead and move it and get it organized. I think that what you are doing in focusing on the international field is important. Here again there has been no real initiative, I think, from the Executive, not only in this administration but in prior administrations, and here again I think the development of the idea and the position this Nation must take ought to be initiated by the Congress again. The comments that you have made and the line of direction, I think is encouraging in setting certain criteria for a beginning of the development of the Continental Shelf and an international organization.

Is it your thinking that it should be the United Nations itself that we should work through?

Senator PELL. No. My thought is the least government, the best government, which has always been a pretty good idea, and I would like to see an international ocean space regime set up under general U.N. auspices, but not under the day-to-day control of the United Nations.

I think it best that we keep some aspect of the National Security Council involved because that gives the United States a veto power. I think any international authority involving the seas is going to have to concern the United States, the Soviet Union, and probably France, Britain, and Japan. They should all have a virtual veto on any long-ranging, lasting decisions affecting their national interests, but once these five can agree—and I am substituting Japan for China—it seems to me we could go ahead.

The authority itself, as you know and I know, and each of you has a copy of my proposal, would then move ahead granting licenses on a first-come-first-serve basis; when there is disagreement, the authority would refer it to an adjudicating body. There would also be set up an International Sea Guard along the lines of the Coast Guard; it would enforce the regulations set forth in my proposal. As you all know, anarchy now prevails beyond the territorial waters.

For example you may have read of the murder committed on one of the Texas towers off the coast of Great Britain; no law applied in that case. By the same token, a mineral company or an oil company could be exploiting some resources beyond the Shelf, and somebody else could steal them, in which case no law applies as of now. This must be changed, I think, to encourage industry.

Mr. ROGERS. Thank you very much.

Again I want to say that I know the members of this committee appreciate the interest and the leadership that you have exerted in the Senate in this whole matter.

Thank you.

Mr. LENNON. Thank you, Mr. Rogers.

May we go off the record for a moment?

(Discussion off the record.)

Mr. LENNON. I will recognize our chairman, Chairman Garmatz.

Mr. GARMATZ. I have just this point.

Senator, on page 5 you say you cannot comment on each of the Commission's recommendations but that you have two specific proposals, and one of them is that you have introduced Senate bill, S. 2230, "removing the existing restriction on use of foreign-built fishing vessels by our commercial fishermen, as recommended by the Commission."

The House has a bill before it now, and we hope to pass it out soon, that we think will be helpful to the fisheries. I wonder if Congressman Pelly from the State of Washington will elaborate on that bill for just a second for the benefit of the Senator.

Mr. PELLY. Mr. Garmatz, it is pretty obvious that the role of the Congress has been to upgrade our fishing fleet which has some 13,000 old and obsolete vessels, and I presume that Senator Pell's objective is to do just that by enabling the fishermen to obtain their fishing vessels, as he has said, at about a third or 50 percent of the cost.

On the other hand, we have legislation on the books which provides that the Government will pay the difference which has completely failed in its objective. Since 1964 we have succeeded in building only 31 new fishing vessels and most of those were built by people who had never been in the fishing business before. I don't say most of them, but the major part of the money went into those. We have failed.

Now, if your bill was passed and the fishermen of this country were enabled to have their fishing vessels built in Canada or Japan or some other country, I doubt very much whether they would take advantage of that because the facts are in this case that imports of foreign fish have so affected the market in this country that there are not enough profits for the fishermen it seems to me to want to replace their older vessels.

I would like your comment on that. I appreciate Mr. Garmatz' bringing it up. What I want to know is why.

Senator PELL. I had a session with the fishermen in my home State who were very upset, as your fishermen are, Congressman, at the closeness of foreign fishermen, and they were not, as you point out, particularly enthused by the idea of buying foreign vessels as my bill would permit when I suggested it to them, but I think that if they actually could buy their vessels at this reduction, you would find normal economic incentive would cause them to overcome their prejudice against buying a foreign vessel.

Mr. PELL. They can buy a vessel at that very cost now and have the Government pay the difference.

Senator PELL. They can, but as the Commission on Marine Science said, on page 97 of its report:

Rather than remove the vessel registration limitation, Congress enacted a vessel construction subsidy act. But the subsidy has not achieved its objectives.

That is somewhat along the lines of what you said:

A provision requiring a finding that the grant of subsidy not cause economic hardship to others in the fishery has resulted in denial of subsidy to those parts of the industry most in need of aid to modernize their fleets.

Generally speaking, if you have a free market, I think those that are most efficient will take advantage of it, and I think that instead of piling one artificial support on top of another, which is what the Vessel Subsidy Act does, to try to balance the law of 1794, if we can get rid of both, then those fishermen with the most chance of competition would buy a vessel on the free market.

As of now they are, as you point out, very distressed. About 70 percent of the fish coming here is from foreign ports. I agree with you that the present act has not done the job.

Mr. PELL. I think the members of the Commission were anything but knowledgeable of the fishing business as far as I know. I talked to a lot of people who are interested in the business, both the small fishermen and the large fishing people, and they haven't even wanted to replace some of their older vessels with a subsidy because they didn't feel that it would be profitable. We have reported out a new bill which would allow a subsidy for the rebuilding of older vessels, and for the reconstruction of vessels.

As it has been, the millions of dollars that have been spent have gone to a very few new and some old fishing operators and only 31

boats have been built since 1964. So I don't believe that your bill would meet the goal that we have of upgrading and benefiting our existing fishing industry. I wish it would.

Senator PELL. It would certainly be to the interest of our taxpayer because it would relieve two balancing subsidy programs.

Mr. PELL. I must say that it would benefit the taxpayer but it would not do the same to the shipbuilding industry which looks to these construction jobs for its livelihood. I wouldn't like to see that business go abroad.

Mr. GARMATZ. Will the gentleman yield?

Mr. LENNON. You have the floor.

Mr. GARMATZ. I would be happy to send the Senator a copy of our bill and a copy of our hearings. We don't want to take up the time of the oceanographic people here this morning on fishing vessels. Thank you very much.

Mr. LENNON. Here is specifically a recommendation of the Commission.

Senator, when did you introduce your bill, S. 2230?

Senator PELL. On May 23.

Mr. LENNON. Do you have any reason to believe that your subcommittee or your full committee will report out a bill to the Senate which will provide for removing the existing restriction on the use of foreign-built fishing vessels?

Senator PELL. Absolutely none. I don't think it will get through.

Mr. LENNON. That is what I would assume.

Senator PELL. It's referred to the Commerce Committee, not to my own committee.

Mr. LENNON. But it will not pass there just as it would not here.

Senator PELL. No.

Mr. LENNON. Even though it is a recommendation of the Commission, and I would like generally speaking to follow the recommendations of the Commission, because I know they made a study in depth. I think we must recognize that if this would come to pass then the next proposal would be the construction of merchant vessels in foreign yards. That would be the subsequent step and the plea, that we had to do that too to avoid the ship-construction differential subsidy.

So we are impaled on the horns of not one but two dilemmas.

All right, the next gentleman is the gentleman from Virginia, Mr. Downing.

Mr. DOWNING. Thank you, Mr. Chairman.

I, too, want to add my compliments, Senator, to you for the statement which you brought to us, and I must say that you don't lack for courage in advocating allowing fishermen to buy foreign-built vessels.

Also on page 10 you make the statement, "To me both of these factors"—that is the fact that the United States has 10 percent of the world Continental Shelf and the fact that we are the leader in the field of applied marine technology—"To me both of these factors mean that it is to our advantage to limit coastal authority."

I wonder if you would mind expanding a little bit on that. What do you mean by "limit coastal authority"?

Senator PELL. I should have spelled that out further. My point is that it is not in the interests of the United States to permit an unlim-

ited extension seaward of coastal State authority. As you know the conflict that is going on now is that the petroleum industry—with its advocates, the Department of Interior and Commerce—wants coastal State jurisdiction over offshore mineral resources extended to at least the landward portion of the continental rise or the beginning of the deep ocean floor.

On the other side, the Defense Department would probably like to see the Continental Shelf doctrine eliminated. So what we have to do is to try to reach a meaningful compromise, and my view is that the narrower the exclusive coastal State zone the better off we are because so much of the continental shelves around the world are outside the United States. This is the best approach not only from a security standpoint and an industry standpoint, but, indeed, from a national standpoint.

Mr. DOWNING. And you advocate, I believe, the 550 meter depth which is, you say, the lowest depth of the Continental Shelf.

Senator PELL. Exactly. The edge of the Continental Shelf is not known to occur at a depth greater than 550 meters.

Mr. DOWNING. And I believe that you advocate that the depth beyond that be settled by an international treaty arrangement.

Senator PELL. That is correct. An international regime to apply beyond the limits of national jurisdiction must be established by a multilateral convention.

Mr. DOWNING. Do you have any ideas in mind just how this would be done?

Senator PELL. Not too specific because I wanted to leave it open, but in the last 3 years we have refined some of these ideas, and it would be an authority, as I said earlier, set up not under the United Nations but in association with the United Nations. The nearest analogy would be the World Bank which has proved very successful, very helpful to our national interest and very helpful to the world.

It would be set up along those lines, but with the added factor of providing for adjudicating and enforcement agencies as well.

Mr. DOWNING. Would this conflict with our defense interests?

Senator PELL. The defense interests may be decided in the next few weeks at Geneva. There are disarmament talks going on now with regard to the Soviet and American draft seabed disarmament proposals, and it looks as if there is a possibility of agreement in the next few months.

The Defense Department would prefer complete freedom, no regulation whatsoever, but I think if you would look through the testimony that they offered to the Subcommittee on Ocean Space, you would find that they would prefer, and you must ask them for themselves, the kind of approach which I suggested, as versus the approach of the National Petroleum Council.

Mr. DOWNING. Thank you very much, Senator.

Thank you, Mr. Chairman.

Mr. LENNON. We will return to the gentleman from Washington who had not completed his questioning.

Mr. PELLY. I have my own questions that I would like to ask you now.

As you know, Senator, in 1958 the Convention on the Law of the Sea gave the coastal State sovereignty over the Continental Shelf and

beyond, where they could exploit it, and you said that is very vague. To me it is not vague. It is our sovereignty, and we have it now. We might want to yield under your program some of that to an international body.

My question to you is: If we decided to do so, could the great body of which you are a member do it by treaty or could the President of the United States do it by agreement or would it take a joint legislative document of the House and Senate?

My understanding is that to give away any property that is under the sovereignty and jurisdiction of the United States, action by both the House and Senate is required.

Senator PELL. I think we have started from different premises, Congressman, because I don't start from the premise that we own the total continental terrace down to the abysmal deep. I agree with you that an argument could be made stating that on the basis of the 1958 Convention.

Mr. PELL. Presume then that we have ownership in some Continental Shelf regardless of how far it goes, some territorial sovereignty.

Senator PELL. If we have ownership then it would be done, I would think, by regular treaty, the treatymaking process, the same way we acquired sovereignty over Alaska by treaty.

It would seem to me that this would be the case.

Mr. PELL. We bought Alaska, and on the other hand, it seems to me that it would require an act of both the Senate and the House to yield any of that acquisition.

Senator PELL. If it belongs to us, if somebody wanted to give away my State of Rhode Island or yours of Washington, it would seem to me that it would take an act of Congress. But we did not start from that premise that it already belongs to us, and I think we are discussing an "iffy" question.

Mr. PELL. I am thinking in terms of the Panama Canal Zone, for example, and I wish that the American Bar Association would, when it becomes their turn, address themselves to that because I would feel a lot safer as far as our possessions and our sovereignty is concerned, if it took the action of both Houses than if it did just the Senate. I don't say that in a derogatory way about the Senate, but we represent I think more in this body the nationalistic viewpoint in some cases than the international sovereignty that you sort of envision.

Senator PELL. I am absolutely sure, as I said earlier. If I had a "y" on the end of my name and were sitting where you are, I would completely agree with you.

Mr. PELL. This is a very unusual situation.

Senator PELL. But I am not.

Mr. PELL. Well, I do think that some of us on this committee have been thinking in terms of yielding some sovereignty to the United Nations and we feel that we should have some say about it here, and I don't ask you to agree with me, but I do raise it here because I think some of us should be thinking about that as we move forward.

Senator PELL. It's a very valid point, and one that some constitutional lawyers, I would think, would be boring in on pretty hard.

Mr. PELL. I have consulted the Library of Congress and some others. I want the American Bar Association to address itself to this

question and get some consensus. All I get are answers from our State Department that everything is very fuzzy. I want to say that we own this or we don't own it, and if we do own it then it would require the acquiescence of both bodies to give it away.

Thank you, Mr. Chairman.

Mr. LENNON. Mr. Karth.

Mr. KARTH. Mr. Chairman.

Pursuing that line, Senator, you expressed great concern about this Continental Shelf limit business, and I think properly so. After all, our somewhat authoritative State Department is involved, the Department of Defense is involved, private industry, literally all nations I guess, and therefore there seems to exist a substantial conflict between the settlement of that question and passage of this legislation or any other since a good part of the total field of oceanology involves exploitation of the oceans in terms of mineral wealth and whatnot.

Are you really saying to us that in your judgment until such time as these Continental Shelf limit questions are resolved that we probably will not get legislation to deal with this problem?

Senator PELL. No. I don't think there is any relationship between the idea of NOAA and the regime or the limit of the Continental Shelf. I don't see a conflict there.

Quite honestly I do not believe that we will reach a decision on the Continental Shelf boundary until we know what sort of regime will come along because the two are absolutely intertwined. If the regime is one that we don't like, we will then go along with the National Petroleum Council's definition and maintain the continental territories right down to the abysmal deep.

If it is a regime along the lines of the World Bank, one in which we play a role and in which we believe we can work and be helpful to it and it to us, then we will accept a narrower definition.

Mr. KARTH. I am happy to have that clarification. I can see in the future somebody probably opposing the bill on the basis that we might well hold this in abeyance until that other rather knotty question is resolved, but I agree that it need not be in conflict with that.

Senator PELL. Personally, as you know, I am moving ahead as far as I can because I think there is the necessity for some force, some pressure to move from the dead center position we are on. It is not only in the United States that we have a no-policy policy. You find around the world that the same thing happens. I don't mean to drop names, but in going around the world I sought to lobby some of these ideas a bit, too. I talked to members of the British Government; to Mr. Kosygin; to Mr. Debré in France; and I found that the leaders around the world have not focused on these problems as much as we have, and one of the reasons that we have focused on this problem is due to the kind of discussions which we are having here today, discussions which on the Senate side we have had for a couple of years.

Mr. KARTH. Thank you very much.

Mr. LENNON. Thank you.

Mr. Dellenback?

Mr. DELLENBACK. Thank you very much, Mr. Chairman. I join in welcoming you, Senator. May I follow a little bit on your colloquy with Mr. Karth.

Not only do you not see any objection to passage of this bill so far as your own concerns as you express them are——

Senator PELL. Excuse me. In general I have not. In detail I want to reserve some positions. For instance, regarding the position of the Coast Guard, I have not yet reached a conclusion myself.

Mr. DELLENBACK. It is the sort of thing that I would like to pursue just a little bit with you, Senator, if I may. Do I understand you as saying that you don't of necessity see any conflict between your concepts relative to the Continental Shelf, et cetera, and the concept of the United States moving forward with an oceanic atmospheric program? Am I correct in that?

Senator PELL. I see absolutely no conflict.

Mr. DELLENBECK. Would you then take the next step and say that not only would there be no conflict but subject to some details where you might be in disagreement you feel it would be affirmatively desirable that we have the United States move forward with this type of a developmental program?

Senator PELL. Very, very much, indeed, and I strongly support the whole thrust of the Commission report in that direction.

Mr. DELLENBACK. This I feel is important because, again as Mr. Karth pointed out, as we proceed in this program and hopefully the House will be able to act successfully in this program, I hope there are no misunderstandings about your opinion because you are one who has given attention to this. So again while we don't ask you to agree with the bill, with every "t" crossed and every "i" dotted, you have made your position clear, and I am glad to hear it, and you think it is not only necessary to move forward, but support our view?

Senator PELL. Very, very strongly, and that is why I am so honored that you are willing to have me here to express these views.

Mr. DELLENBACK. Thank you very much.

Senator PELL. One question in connection with moving ahead on the Commission report is that I think there ought to be a decision with regard to a moratorium on claims beyond, say, 200 meters from the viewpoint of permanent ownership until this question can be decided at a future date, and I believe this is in line with the general approach of the Marine Commission report.

Mr. LENNON. Thank you.

Mr. Hanna?

Mr. HANNA. Thank you, Mr. Chairman.

I, too, am glad to see you again, Mr. Pell, on this very important subject matter which I think you and I have discussed before. You will recall, Mr. Chairman, that I was particularly concerned about the actions of the U.N. on the Continental Shelf some time back. I am glad to hear the statement from the Senator as to his ideas of how we might be able to proceed in that matter.

I am concerned that we as a nation pursue as constructively as we can the idea of some more clear definition of the Continental Shelf than is presently available. I think we should also be pressing for some broader agreement than we now have. It is a matter of continuing concern to us, and I think a problem for particularly myself and some others along the Pacific coast that some of the nations are claiming jurisdiction out as far as 200 miles.

I think there are some eight or nine nations that have present declarations in national policy that would indicate that they have claims which most of us would not support.

So that I think there is a need to keep the pressure on and keep our position being pressed.

Senator PELL. In response to your point and in line with the exchange with Congressman Pelly concerning whether two adverse points make a right, I am struck here by the fact that it was the Truman Proclamation of 1945 which firmed up the notion of coastal State jurisdiction over adjacent Continental Shelf resources. This proclamation contained no preuse limit for the Continental Shelf boundary; then a couple of years later this action on the part of the United States caused those countries which simply have no Continental Shelf to come out with their own claims. Some including jurisdiction over the water column and extending seaward for 200 miles.

I think there is a direct relationship between these actions. I would hope in this connection, Mr. Chairman, you might see fit to have your staff look at the statement of Mr. Wilkey, the general counsel of Kennecott Copper. He wrote a technical paper on this issue which explains the problem more clearly than anything else I have read.

Mr. LENNON. Do you have a copy of that that you could furnish our counsel?

Senator PELL. I will submit it for the record.

(The statement of Mr. Wilkey follows. The technical paper was placed in the files of the subcommittee.)

STATEMENT OF MALCOLM RICHARD WILKEY

Senator Pell's Senate Resolution 33 postulates in the Preamble: "... progress towards international cooperation in the exploration and exploitation of ocean space and its resources and the development of the rule of law in this area of human endeavor is of comparable importance to that achieved in the field of outer space." It is therefore timely that these hearings on ocean space take place after our astronauts have completed the first human landing on the moon and returned to earth only yesterday.

I am particularly grateful to have been asked to present a *private industry* viewpoint on Senate Resolution 33, because, while so far mankind's launch into outer space has been entirely accomplished by government propulsion, it has not been so for man's venture into the ocean deep. Historically the oceans have been the broadest highways of commerce. Historically the oceans have been a principal source of food. Other private uses of the deep sea are rapidly assuming importance today, for example, recreation. Activity in ocean space has been and is largely private, individual activity, and will doubtless continue to be so. It is essential, then, that "basic principles" seeking to govern the activities of both nations and private persons and organizations in ocean space should recognize this fundamental fact. Otherwise the "basic principles," if in conflict with existing fact, will have difficulty of acceptance.

Senator Pell is to be congratulated for his foresight in placing this Declaration of Principles before the Senate for analysis and discussion. Foresight and preplanning many years ahead to match technological development with legal, political, and economic progress are required if we are to make the most of our opportunities in ocean space.

In the interest of both time and space, I shall spend far more time pointing out sections of Senate Resolution 33 which in my judgment should be changed, rather than endorsing in detail those sections on which I have no suggestions. I don't want this to indicate an overall criticism of the Declaration of Principles, but this procedure is I think necessary and desired by this Subcommittee. This Resolution gives thoughtful consideration to many noncontroversial aspects which easily could be overlooked in the drafting of an overall approach to ocean space,

and many of these non-controversial sections are equally important with those on which I shall have some suggestions for change.

The fundamental principle of this Declaration is found in Part I, Article 3: "Ocean space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." It is not essential to have sovereignty, or fee simple title of ownership, to encourage a development of mineral resources. Article 3 does not rule out the necessary security of tenure to encourage natural resource development.

The portions of this Declaration which give me the most concern, and which appear to need a reorientation, are found in Part I, Articles 5 and 6, and Part III, Articles 1 and 3. Let's examine these four Articles together.

Article 5 of Part I refers to "The activities of States in the exploration and exploitation of ocean space and its resources. . . ." There is no mention of the nationals of states here, while it is obvious that private enterprise historically has had the greatest role in the oceans and probably will so continue in the future. Again, in Article 6: "States bear international responsibility for national activities in ocean space. . . ." Article 6 goes on to say that the activities of non-governmental entities and nationals of states in ocean space "shall require authorization and continuing supervision by the State concerned." Here again is the idea of the State either doing it all or being responsible for it, which is contrary to both the existing legal and economic situation. Again, in Part III, Article 1, "States shall engage in such exploration or exploitation only under licenses. . . ." There is no reference to "States or their nationals." Again, in Article 3 of Part III is a reiteration of the required authorization of the State for any activity by the nationals of that State in ocean space, comparable to Article 6 of Part I.

CONSIDERING THESE FOUR ARTICLES TOGETHER

1. The whole philosophy of Articles 5 and 6 of Part I and Articles 1 and 3 of Part III is that the *States* are going to do it all in ocean space. This is contrary to previous history and contrary to what I think a reasonable prognostication at this time would be. If the Declaration of Principles started at this point with the idea that most meaningful economic activities have been and are likely to be carried on by free private enterprise, at least by the Western-non-Socialist world, the Declaration of Principles would be drafted differently here and in several subsequent sections. This would not only avoid certain difficulties which I foresee, but would also actually work to accomplish the objectives of the Declaration, that is the development of ocean space for the benefit of all mankind, in a much more expeditious manner.

2. With particular regard to Article 6 of Part I, "States bear international responsibility for national activities in ocean space, whether carried on by governmental agencies or non-governmental entities or nationals of such States," this appears to broaden greatly State responsibility under existing law. To my mind, such an unqualified principle has never applied to maritime transport, to fishing, to recreation, to oil drilling, or to exploration or scientific experiment in the deep ocean. Would this make the U.S. Government liable in a case of a collision between a U.S. flag ship and the ship of another country in international waters, if the U.S. flag ship were at fault? Could a lone scuba diver, if operating in the deep ocean, implicate the United States? The objects of Article 6 appear to be to avoid conflicts in ocean space and to pin responsibility on parties big enough to shoulder the responsibility, i.e., Governments. I submit that the same objectives can be achieved with existing legal principles and a much simpler mechanism, such as the Notice and International Claim Registry recommendations of the President's Commission.

3. Further under Article 6, "The activities of non-government entities and nationals of States in ocean space shall require authorization and continuing supervision by the State concerned." This would impose on each nation the exertion of an authority which probably few countries in the Western world exert at the present time. Surely each nation should be left to decide for itself what degree of supervision it will exercise over its own nationals.

4. If there is set up either a licensing authority or an international claim registration agency as recommended by the President's Commission, surely minimum supervision over the nationals of an individual country should be sufficient. Compliance with the rules and regulations of the international claim registry (dis-

cussed later as preferred to the licensing authority set forth in the Declaration) should be enough.

5. Many practices in ocean space, for example, recreation, require no supervision at all.

6. There is built in here a "flag of convenience" problem. Which State, the State in which the particular persons involved have citizenship, or the State whose flag the vessel or enterprise is flying, shall be required to exert supervision? Are we going to require "a genuine link" between the persons engaged in activities in ocean space, or take the flag of convenience at face value? And what about such international entrepreneurs as Aristotle Onassis, generally thought of as a Greek, usually but not always operating through Greek corporations, but who happens to be a citizen of Argentina? Which nation will be required to exercise supervision over Mr. Onassis' enterprises?

7. Part III sets up an international licensing authority for exploration or exploitation of ocean space. I respectfully submit that all of the purposes of this Declaration of Principles for ocean space could be accomplished by an international claim registry of the type recommended by the President's Commission in its Report in February 1969, and that the creation of a licensing authority will introduce many complications and problems which would be avoided by the type of an international claim registry authority recommended by the President's Commission. On pages 147-149 of the President's Commission Report this international registry authority organization and functions are described in detail. In essence, the international claim registry authority represents an international courthouse, at which mining claims could be filed on a first-come, first-recorded basis. This, I believe, would be acceptable to the mining industry. So long as the international registry authority goes no farther than this, it would be helpful in bringing order, regularity, and certainty into the mineral development of the deep ocean.

In comparison with a claim registry system, a leasing or licensing system always interposes a government agency between the individual entrepreneur and his actions, it lessens incentive, and restricts maximum and efficient development. Licensing systems almost universally entail prior permissions, as Senate Resolution 33 does, operating controls, and if deficient in the clarity of standards for resolving disputes, as S. Resolution 33 may be, it interjects uncertainties which are not conducive to the undertaking of high risk, complicated mining ventures.

From the point of view of the mining industry, the international claim registry authority proposed by the President's Commission Report, "Our Nation and the Sea," is to be preferred to any prior licensing requirement such as is set out by Senate Resolution 33. Furthermore, such a claim registry on a first-come, first-registered basis would accomplish all of the purposes apparently intended by the licensing authority proposed, and in a much simpler fashion.

8. The whole approach reflected in Articles 3 and 1 of Part III is that States *only* can make application to the international licensing authority on either their own behalf or on behalf of their nationals. This reliance on the States only stems from the previous provisions that the States will exercise supervision over all activities of their nationals in international ocean space, which is a departure from existing law and will introduce some new complications. There are also some positive drawbacks to having any national government intervene between private enterprises and the international registry (or license) authority. For example, the offices of half a dozen mining companies are only a few blocks from the United Nations. If we were required to forward a mining claim to a Washington bureau to pass on before it could be registered, there could be unfortunate delays and complications. If at any time while a mining claim, or a petroleum claim, was sitting on some Washington official's desk, waiting for approval to be sent to the international registry or licensing authority and the Russians or the French filed ahead of it, there would be a justifiable howl from any American company.

Why any government agency, for example, the Interior Department would want to assume this responsibility of filing claims on behalf of private companies is obscure. The persons or companies who explore and discover such mining claims are the most competent to draft and most interested in seeing that they are filed. Of course, the Department of the Interior might very well demand a record of such mining claims filed by U.S. nationals, and this would be a sensible provision. Or, there might be a provision for simultaneous filing with the international registry authority and the national government in order to validate the claim. In order to discourage international speculators from claiming vast areas for the purpose of peddling, not development, perhaps endorsement by the claimants' national government could be made a condition subsequent to validation.

But why put in the chain or process a U.S. Government bureau? And why (other than to swell the bureaucracy) would such government department want to assume the responsibility of filing mining claims on behalf of U.S. companies? This introduces an entirely unnecessary step in the process, and might very well be susceptible to political abuse, or equally bad, be suspected of being politically abused.

If licensing instead of simple claim registry on a time-priority basis is used, we have two places, the national government and the international agency, where discretion and authority may be abused or suspected of being abused.

9. Since this Declaration of Principles is to be introduced in the Committee at the United Nations, it perhaps appears logical that the licensing authority, or the international claim registry as many would prefer, would be "designated by the United Nations." However, this licensing authority to be designated by the United Nations should be clearly an agency *independent* of the United Nations after it is created, e.g., the parallel of the World Bank. The composition and authority of this independent agency must be spelled out and agreed upon before it will become acceptable to a great many nations—possibly including our own.

Let me turn now to Article 4 of Part III, which spells out how licenses are to be issued and on what considerations.

1. This whole provision illustrates the undesirability of having a licensing authority in contrast to a simple claim registry as recommended by the President's Commission. When an office is to issue a license, in contrast to filing a claim, it must have certain criteria on which to issue the license. These criteria must be simple of application, beyond dispute, and not subject to abuse or possible corruption. It is difficult to prescribe such criteria and even more difficult to administer them fairly afterwards, as we see by the very simplest kind of licenses, for example, for a liquor store or a taxicab in New York City.

2. By illustration, the requirement of Article 4 that the licensing authority "shall give due consideration to the potential impact on the world market for each resource to be extracted or produced under such license," has the potentiality of setting up an international cartel in any given natural resource, beyond the power of the Antitrust Division of our Department of Justice to do anything about. This would require the licensing authority to judge between the needs of consumers for supply available at the very lowest price and the needs of the producers to make a "fair" return on their investment. This is the kind of regulation which is difficult to apply even on one product like electricity, much less on the raw material resources of the world. It will be quite a job for any licensing authority.

3. It is really difficult for any regulatory agency to regulate and license (a) intelligently, (b) without political bias—and here we would have an international political bias interjected—and (c) without corruption. Given complete honesty, great intelligence, the good will of all nations, this international licensing authority is really being asked to do an enormous job.

4. It is an enormous job which is not necessary to be done. An international claim registry system, as recommended by the President's Commission, could apply the same specific criteria which are listed under Article 4 with far better results, and with far less chance of being subjected to international criticism from all sides.

5. The validity of the criticism just made of the first part of Article 4 of Part III on the licensing criteria is substantiated by the fact that, if two or more States apply for a license for the same ocean space, there are no criteria (except to benefit developing States) set forth whereby the licensing authority shall determine which State shall receive the license. The licensing authority must have clear criteria given to guide it, otherwise it is subject to criticism no matter what it decides. The simplest criteria, of course, would be on the basis of priority in the time filed. This is customarily the basis on which mining claims are governed, and the basis which the President's Commission recommended be taken in their international claim registry, subject, of course, to the applicant being responsible. The provision in Article 4(b) as now written is an open invitation to "claim jumping" problems on an international scale.

Going further to Article 4(c), this states: "A coastal State has a *special interest* in the conservation of the natural resources of the seabed and subsoil of ocean space *adjacent* to its territorial sea and continental shelf. . . ." Exactly what follows from this "special interest" and in what way would this "be taken into account by the licensing authority"? Would this give applicants under the flag of the coastal State a priority in getting a license ahead of some other applicant which had applied first or had other superior qualifications? What is

the extent of "ocean space adjacent"? How far beyond the continental shelf is "adjacent"?

In Article 4(d) immediately following, the words "in that area" apparently refer to this "adjacent" area. To avoid disputes as to whatever follows from these provisions, "that area" and the consequences of being in "that area" should be defined more clearly.

Under Article 4(e) an effort is made to reconcile exploitation of natural resources of the seabed with other possibly conflicting economic uses of the sea. Yet there is no attempt made here or in other parts of the Declaration to reconcile the exploitation of natural resources with military use. There should be, even if it is contemplated that a separate treaty will proscribe permanent military installations on the deep sea bottom. There will always be mobile military uses which should be recognized.

With reference to Article 7 of Part III, the power of the licensing authority to suspend, modify, or prohibit the projected activity or experiment which on the allegation of another State might cause potentially harmful interference with its activities, could be used to stymie exploitation and development for years, or to block military activity perhaps. This kind of power really does not need to be vested in the licensing authority itself, but should be part of an overall settlement of disputes mechanism connected with the Principles regulating ocean space.

Again, the placing of this type of power in the licensing authority might be considered a logical outgrowth of the concept of licensing itself. If the basic concept were an international registry authority, a much simpler mechanism, then probably this type of power would not even be thought necessary, another illustration of the advantages of a simple claim registry system as compared to a licensing authority.

Under Article 8 of Part III, I would suggest some provision in regard to the safeguard of proprietary information after any inspection either by the licensing authority or the Sea Guard.

I note that under Article 9 there has been an insertion of the right of the license owner to correct any failures of compliance, which had been recommended in regard to the Draft Treaty introduced by Senator Pell. Also, under Article 16, the tribunal for the adjudication of disputes is required to render a decision within a period of ninety days, which is a great improvement over the Draft Treaty.

In regard to the review of disputes provisions in Articles 12 through 16, however, I would say this. A review authority is needed. It should insure prompt, fair, and respected adjudication. The provision for ultimate *compulsory* review by the World Court may cause some States to shy away from the whole concept of this Declaration of Principles.

If this Declaration of Principles were modified in the ways suggested, a great amount of the political overtones of the Declaration of Principles would be eliminated, and it would stand as the enunciation of Principles for the economic development of ocean space, which along with the reduction of chances of conflict appears to be the basic purpose of this Declaration of Principles.

It would also be wise, whatever review tribunal is set up, to permit private parties to litigate on their own in the appellate form. This illustrates again the wisdom of allowing private parties to be the original applicants for either licenses or claim registry. This will serve to de-escalate disputes, which inevitably will arise in regard to deep ocean mineral resources, to private commercial arguments, instead of major political issues between sovereign States.

Turning now to Part IV, *Use of the Seabed and Subsoil of Ocean Space for Peaceful Purposes Only*, I submit that the logical purpose of preserving the seabed for peaceful purposes only can best be accomplished *separately*, not in a Declaration of Principles primarily devoted to the regulation of the seabed for commercial purposes. You will recall that the military provisions were separately considered in the United Nations Ad Hoc Committee, and I believe are now being taken up as part of the general disarmament negotiations. In the U.N. Ad Hoc Committee the United States introduced two separate resolutions, one dealing with the economic development of the deep ocean, and the other dealing with the purely military considerations.

You will also recall that the 1958 Convention on the Continental Shelf gave the coastal state "sovereign rights for the purpose of exploring it and exploiting its natural resources." This was a limited extension of the coastal states' powers for a limited purpose. It is sufficient to insure the development of the mineral

resources of the continental shelf under the aegis of the coastal state, to the extent that the coastal state desires and is capable of so developing.

A limited purpose regime can similarly encourage and secure the development of mineral resources in ocean space. The linkage of this purpose with military considerations will result in less than the optimum which is obtainable in either the economic or military sphere.

In other words, the Declaration of Principles should envisage an international mechanism for administration on as strictly a commercial and economic basis as is possible. It will work better that way. It will be simpler to administer, it will be easier to get adopted, and disputes arising out of it can be settled on a much lower plane. Military and other not necessarily related considerations can and should be dealt with in separate instruments on separate bases.

For the moment I will pass over Part VI, *Limits of the Continental Shelf*, and turn to Part VII, the *Sea Guard*. I have mixed feelings about the proposal for the Sea Guard. The existence of it would reduce the dangers of an armed clash of national forces arising out of conflicting claims in ocean space. The development of an international sea force is a step in the direction of creating an international force to reduce the chances of national conflict, which is generally to be applauded.

On the other hand, in consideration of the overall objectives of this Declaration of Principles, the rationale for the Sea Guard largely disappears if military use restrictions are deleted from the proposed Declaration of Principles. It may be useful to create the U.N. Sea Guard if political and military issues are to be dealt with in this Declaration. But if we deal with clearly economic and commercial matters, then the Sea Guard does not appear necessary.

If the Sea Guard is compared in power to the naval forces of any national fleet, proportionally it probably is reduced simply to an observer force anyway. To police compliance with commercial restrictions relating to the licensing or claim registry, an observer force without the military connotations of the Sea Guard could be utilized for commercial inspection purposes, and would fulfill all required functions.

Turning now to Part VIII, *Crimes in Ocean Space*, I think this is a highly useful and necessary provision. It is a good example of various provisions scattered throughout this Declaration of Principles on which I have not commented, which are laudable and probably non-controversial, and might be overlooked without Senator Pell's having introduced Senate Resolution 33.

I have deferred discussion of Part VI, *Limits of the Continental Shelf*, until the last, because the problems raised by this are illustrative of the interrelationship of the boundary location and the legal regime governing ocean space, are a demonstration of the degree and source of the urgency to create the detailed legal regime for ocean space, and discussion of this logically leads into the overall procedure which I believe we should follow to secure the objectives of this Declaration of Principles.

First of all, in regard to the limits of the continental shelf and the recommended boundary at a depth of 550 meters or a distance of 50 miles from the base line of the territorial sea, remember the history of all negotiations connected with boundaries in the deep sea. At every international conference it appears that the other nations wait to see the position of the United States on the boundary of the territorial sea, the continental shelf, or whatever is up for discussion, and then take the U.S. position as the *narrowest* and proceed from there to enlarge it.

An enormous part of the discussion of the boundary of the continental shelf has come from advocates of a so-called broad shelf, who appear to be animated by a fear that other nations will not accept a claim by the United States to a broad shelf, and that there is some immediate requirement that the United States assert such a claim. All history of similar negotiations show just the opposite. We have no difficulty getting accepted however broad a claim we make, the others have always gone us several miles better.

Now what is the urgency of creating this international legal regime, and how does this urgency derive from the interrelationship of the boundary location and the character of this new international legal regime governing ocean space?

I must say that I agree with Senator Pell that there is some urgency in developing a more detailed public order for the oceans, although I would not call it exactly a "threat of anarchy", since there is no legal void existing in the deep ocean. The long recognized principles of freedom of the seas apply to the use of

international waters and the taking of mineral resources of the deep ocean seabed and subsoil. In a nutshell, the use of the ocean surface and the water column beneath belongs to everyone, and can therefore be appropriated by no one; the fish and other living organisms, the mineral resources of the deep ocean seabed and subsoil, belong to on one, and can therefore be appropriated by anyone; anyone engaged in the use of the seas and utilization of its resources in accordance with these rules is entitled under international law to be undisturbed in his exercise of such rights.

However, the present legal rules may not envisage a United States national merely staking a claim on the ocean floor, then leaving the area unoccupied returning to it without challenge by an actual occupant. Nor is there the other certainty and specificity of mining rules necessary to justify a large-scale investment in a fixed location mineral development at the present time.

Exactly when such specific rules will be needed is impossible to predict at this time; it depends on the march of technology now proceeding at a rather rapid pace. Within a decade we probably will be testing a system of "harvesting" nodules. Whether it will be commercially profitable is another matter. Mining the ocean bottom, if it comes at all, will be much later.

Since the large-scale development of any mineral resources in the deep ocean may require a detailed specific regime which does not now exist, and the articulation of this detailed legal regime is interlinked with the location of the boundary of the continental shelf, it is not too soon to be thinking seriously about where the boundary should be and of what the international legal regime and organizational structure should consist. For the mining industry this interrelation of location and legal regime accelerates the need for boundary location.

The seabed and subsoil of these international ocean areas, on all present knowledge, contain much the greater part of the resources attractive to the hard mineral industry.

In terms of both industry and national interest, an international legal and political framework applicable to these resources is therefore a matter of immediate concern. It will take time to do this, thus working out an acceptable international legal regime is an important part of our planning today. In this planning, we are fully justified in carefully balancing our potential but not yet realized continental shelf claims against the kind of international legal regime we want.

The President's Commission recommended a formula for establishing the boundary between the area of national jurisdiction and the international zone, and simultaneously recognized that there is an important interrelation between the boundary location and the characteristics of the legal regime on either side of the boundary.

Obviously, if a detailed international legal regime and organizational structure can be worked out that is highly encouraging to free private enterprise in the development of the mineral resources of the deep ocean, a narrow continental shelf would be acceptable. In such a situation a narrow continental shelf would mean that U.S. private industry would have access to mineral resources on favorable terms, whether on the U.S. continental shelf or in the international zone, and most importantly would have the advantage that the continental shelves of other coastal states around the world would be narrow. We thus would have unrestricted access to vast areas of the deep ocean which otherwise could be locked up by coastal states, and even on the shelves of the coastal states, the availability of favorable terms in the international area would put competitive pressure on the coastal states to grant reasonable terms on their continental shelves.

On the other hand, *if either an international legal regime and organizational structure unfavorable to free enterprise development is worked out, or no legal regime with the requisite certainty and specificity of rules is formulated at all*, then the argument will be irresistible for a broad Treaty Continental Shelf in order that American industry have the certainty of operating under known and established rules. Hopefully, these would be favorable to private industry on the U.S. continental shelf and on the continental shelves of at least some other coastal nations around the world.

The President's Commission cautioned that its "major recommendations are interrelated." I submit that so are the Principles embodied in Senate Resolution 33. Whether in regard to these or other proposals in negotiation, this illustrates U.S. bargaining in the international arena must be extremely careful not to commit ourselves to one essential element until all essential elements are safely under control.

I submit that, thinking in terms of United States long-term strategy in ocean space, basic to this truly complex development of deep ocean mineral resources is the imperative need the synchronize and coordinate diplomacy, domestic legislation, and administrative practice with the acquisition of knowledge and the creation of technology in the deep ocean.

We need more even rudimentary knowledge of the ocean depths and the resources which may or may not be there. We are only beginning to create a technology which will lead first to knowledge and ultimately—we hope—to commercial exploitation.

A genuine need exists to educate the governmental officials of all nations as to the realities of life in ocean space. Great expectations of immediate wealth have been fostered; these must be quietly, patiently exposed as drastically overdrawn. At this stage of our knowledge we cannot prepare a final draft of a detailed legal regime for ocean space. We should not assert that the boundary between the coastal state continental shelf and the international ocean space should be here and nowhere else, irrespective of the shape of the reciprocal pieces in this puzzle. Nor is it yet time to call another conference on the Law of the Sea, or to promulgate a U.N. resolution at this moment, although that might become appropriate later.

This does not imply inaction. We have a tremendous amount of work to do educating ourselves and the other nations as to how best to attain and utilize, under what rules and which governmental entities, the resources of ocean space. *Our ideas as to the legal regime should develop coordinately with the progress of technology.*

In furtherance of the objectives of this Declaration of Principles, S. Res. 33, I submit that we can and should do the following:

1. Create a U.S. mining claim law for our own continental shelf. This we should be able to draft now, realizing that domestic legislation or administrative rules are much easier to change than an international treaty.

2. Gain operating experience under this mining claim law and the Continental Shelf rules of other nations.

3. Continue exploration and research in the deep ocean, under the present general rules of international law, supplemented as time goes on by informal codes of conduct agreed to by the great maritime powers.

4. Work out interim arrangements in limited areas with the few nations directly concerned on a reciprocal basis, fixing the shelf boundary and elementary detailed rules for the limited international area; gain experience working on and off the shelf under the applicable coastal state and international rules.

5. Set up a simple international claim registry office, where notice can be given of intent to work or actual working of a particular area of the deep ocean seabed or subsoil.

6. As technological capabilities expand, develop concurrently from available working experience in all areas a body of detailed rules for mineral resource exploitation of the international deep ocean. *Despite reliance for a number of years on currently established international law, unquestionably some day new detailed rules will be needed.* Some industries and some nations may have little interest in establishing an international legal regime in detail. But for a Great Power like the United States, particularly for its hard mineral industry, the need may be paramount in little more than a decade. As we learn, we must think, write, create these rules.

7. As the body of the detailed international legal regime slowly develops, with the concurrence of the great maritime powers and the most important coastal states, on the basis of general satisfaction with and adherence to these international rules, create the simplest appropriate international machinery to secure compliance with this international legal regime.

8. At the same time, when we know generally what the rules and their enforcement machinery will be like in the international zone, delineate specifically and finally the boundary between the Treaty Continental Shelf and the international area.

9. Throughout this process, not in an arrogant spirit but as a realistic recognition of the capacity of the United States in international negotiations, keep in mind the strong bargaining position of the U.S.:

—Without *Agreement*, there can be no new detailed international legal regime;

- Without a *New International Legal Regime*, there can be no revenue from Ocean Space for the Less Developed Countries ;
- In the absence of an overall international Agreement*, operating arrangements on a reciprocal basis between a few Great Maritime Powers could probably be worked out, and as a practical matter would likely provide the requisite certainty to encourage the mineral development of the Deep Ocean.

10. The United States has an important stake in World Public Order, historically in the "Public Order of the Oceans", and it should not hesitate to use its strong bargaining position to secure *Public Order in Ocean Space* on fair and reasonable terms.

I am grateful to Senator Pell and this Committee for the opportunity to present these views.

Mr. HANNA. Then it seems to me that there is one other point that needs some attention in terms of our approach and that is that as I read it there are different attitudes toward sovereignty and how you are willing to break off your sovereignty in some of the leading nations. I think that the attitude of some people in the United States has been a little more liberal than you could claim for some other places in terms of their willingness to be subjected to decisions made outside our country.

I think that a narrow approach would be that although you might have an international authority that its encroachment on your sovereignty would not go any further than specific treaties and agreements spelling out very definitely where their operational lines were.

I doubt that you would go very far if you didn't spell that out very strongly. I can't see the World Bank, for instance, as being a law-maker. It operates on the basis of its swat which is cash which is a pretty big swat, and you can get the conduct and response of parties predicated not upon the fact that this is law but predicated on the fact that you have something they want and if they don't do what you tell them you withhold the thing desired, which is another way to get conduct ironed out, but it isn't predicated on law.

Maybe you have some idea of putting this kind of swat into the international authority.

Senator PELL. The problem is that there are so many inevitable conflicts. For instance, an oil rig might be constructed in a fishing ground; some law or some authority must determine who has what rights and where.

What I find so hard to believe is that we have a body of law governing outer space as to the discoveries made on the moon; while it has not been spelled out, there is some body of law that covers the resources of outer space, but we don't have any such body of law to cover the resources of inner space or ocean space.

Mr. HANNA. Well, Mr. Chairman, I think that there is a distinction to be made in terms of expressions that are called law that are barely general in their coverage and those things that are real active law which in my judgment don't come into being at all until you have created a situation in which there is a power on the part of one party and a duty on the part of another party and an enforcement agency in between to be sure that the party with the power can wield it and the party with the duty has to assume it and if you haven't got to that point, it seems to me you have got a rather weak situation to be calling it law.

In that regard, Mr. Chairman, I hope that at an appropriate time we might be able to include in the declaration of policies and objectives in your section 102 a positive statement about the encouragement of the advancement of the law of the sea because I think that you are going to run into this every turn you make, and I don't think that we have had a sufficient attention to that in the past.

Now, in the immediate present, I think that there has been lots more awareness, for instance in the American Bar Association. Since you are working in oceanography, Mr. Chairman, I think they have become tremendously alert and more actively engaged in constructing the positive law of the sea, but I think we are a long way from the mark that we have to hit before we are going to be in a good posture, Senator, to do some of the things that you have in mind both within and without the country.

Senator PELL. The tragedy is that if we keep waiting and this is, I think, what the petroleum industry would like to see happen, if we keep waiting, national claims will have been laid to the total continental terrace and it will be too late because you can never roll the carpet back. You can only roll it ahead.

Mr. HANNA. I join you in the concern, but I would say that that is only an added reason for us to make a very strong statement of policy and objectives relative to establishment of more effective positive posture for the law of the sea.

That is all, Mr. Chairman.

Mr. LENNON. Thank you.

Do you have any additional questions, Mr. Chairman?

Mr. KEITH. I have just one question.

Mr. LENNON. Off the record.

(Discussion off the record.)

Mr. KEITH. I was involved this morning at the Committee on Interstate and Foreign Commerce.

Mr. LENNON. Senator, in your opening remarks you decry the fact that the whole spectrum of oceanology and oceanography and marine sciences was not getting through the news media any attention and unfortunately, although we are grateful that they are here, practically the only press media that attend hearings related to this sort of subject matter are people who are editors and writers for magazines and periodicals related to the subject matter.

It just simply doesn't attract attention. I am struck with what you say here, and I think this judgment is shared by a lot of people, and I quote you from page 3:

While detracting not in the least from our building of pyramids in space, I believe our national oceanologic program has far greater potential for enriching the life of man here on earth.

Recognizing that you are a person who is tremendously interested and concerned with the subject matter, that is worthy of a headline in all of our news media, but if that isn't sufficient to attract attention, I think we can requote the statement made by Mr. Drucker:

* * * we are about to tackle systematically the development of the oceans as the greatest economic resource to be found on this earth.

Now, those quotes should get into the news media at all levels, the press, television, the radio, the dissemination where one dissenter can

get out here and be interviewed on any subject matter and get publicity on every news media in the land but things that are vital and essential to the welfare of people don't get that kind of attention.

I say that hopefully that the representatives of the news media here will requote the distinguished Senator and requote Mr. Drucker's statement.

In connection with a matter that has been discussed so much in detail, the international law of the sea and its implications, I am going to ask something of our new counsel who is making his first appearance, and I did not take the time to introduce him since most of you have had the pleasure of meeting him, the former distinguished professor of law at one of our great universities, a person who is a graduate of the Coast Guard Academy and who had a very distinguished career in the Coast Guard, and then when he left the Coast Guard after serving with distinction and honor in that great organization, he pursued the course of his desire, law, especially in the field of international law. I am going to ask him to take your statement, particularly that latter part of it and try to study it and get the information from the statement that you said that you would secure for us made by someone before your committee. We are going to put you on this board and make a witness out of you. We are going to want you to redevelop what has been said here this morning so that we can go into that in some special session.

Thank you very much, Senator.

Did you want to ask a question?

Mr. KEITH. I want to apologize for my inability to get here sooner. I have been as interested in the subject as anybody.

Mr. LENNON. You just go right ahead, sir.

Mr. KEITH. Not having been here for your statement and not having heard the discussion that has been provoked by your comments, I have only one question. First, however, I would like to compliment the Senator on the progressive role that he is playing in developing a discussion of this subject and a widespread knowledge of it.

My one question is: Have you solicited, by chance, the opinion of the eminent scientist Dr. Paul Fye at Woods Hole as you developed your views on this subject?

Senator PELL. I know Dr. Fye. We have exchanged correspondence, and I have not specifically asked him for his comment on Senate Resolution 33, no. But I have addressed meetings in which he has been a participant.

Mr. KEITH. Thank you. I will be glad to ask Dr. Fye for his comments. He has been before this committee on many occasions.

Senator PELL. He would make an excellent witness.

Mr. LENNON. Thank you, Mr. Keith.

Thank you, Senator.

Senator PELL. Thank you.

Mr. LENNON. We are very honored this morning to have the gentleman whose name I mentioned earlier, Mr. Northcutt Ely, who is the chairman of the Committee on Deep Sea Mineral Resources of the American Branch of the International Law Association, and a member of the Council of the Natural Resources Section of the American Bar Association.

Mr. Ely, will you come forward?

STATEMENT OF NORTHCUTT ELY, OF WASHINGTON, D.C., ON BEHALF OF THE AMERICAN BAR ASSOCIATION AND ITS SECTION OF NATURAL RESOURCES LAW

Mr. LENNON. Let me ask you, sir, your statement will take about how long?

Mr. ELY. I shall accommodate myself to your convenience, Mr. Chairman. I would suggest that if it suits you, my statement be printed in full as though read, and I will summarize it.

Mr. LENNON. I would appreciate that under the circumstances, because I am advised we will have an early quorum call.

Without objection the gentleman's full statement will be printed in the record at the appropriate place, and then you take as much time as you like, sir.

Mr. ELY. Thank you.

(The documents may be found at the close of Mr. Ely's testimony.)

Mr. ELY. My name, Mr. Chairman, is Northcutt Ely. I am a member of the law firm of Ely and Duncan, of Washington, D.C. I am a member of the Council of the Section of Natural Resources Law of the American Bar Association, and appear here by direction of the chairman and council of that section.

I annex as appendix A a resolution (No. 73) of the House of Delegates of the American Bar Association, adopted at its August 1968 meeting. This is incorporated in a Joint Report of the Sections of Natural Resources Law and International and Comparative Law and the Standing Committee on Peace and Law Through United Nations, recommending that resolution.

Only the resolution itself states official policy of the American Bar Association. The balance of the annexed 1968 joint report states the supporting argument of the sections which recommended the adoption of the resolution.

The resolution, and the supporting report, deal with two major subjects:

1. The seaward limit of the exclusive jurisdiction of the United States with respect to exploration and exploitation of submarine mineral resources;

2. The international arrangements which should control the exploration and exploitation of submarine mineral resources seaward of the limits of national jurisdiction of the coastal nations.

In discussing these I shall refer to a pending draft report of these same sections which will come before the councils of the respective sections next week, and I must therefore for the moment refer to it as a draft report.¹

First, as to the submarine mineral resources within national jurisdiction: The character, and the geographical limit, of the rights of coastal nations are controlled by the Convention on the Continental Shelf with respect to those nations which are parties to it, as our country is. Some segments of the convention have been construed by the International Court of Justice as stating customary international law, which is generally applicable even in the absence of agreement.

¹ This report was approved by the sections of Natural Resources Law and International and Cooperative Law and the Standing Committee on World Order Under Law at the August 1969 meeting of the American Bar Association. The full text is annexed.

The articles of the convention which are pertinent to today's discussion are articles 1, 2, and 3.

Article 1 defines the term "continental shelf" as referring "to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or"—and here is the crucial point—"or beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas."

Article 2 of the convention states in section 1, paragraph No. 1, that "the coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources."

Paragraph 2 of that article is frequently overlooked. It says:

The rights referred to in paragraph 1 of this article are exclusive in the sense that if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities, or make a claim to the continental shelf, without the express consent of the coastal State.

Article 2 goes on in paragraph 3 to say:

The rights of the coastal State do not depend on occupation, effective or notional, or on any express proclamation.

Article 3 stipulates that:

The rights of the coastal State over the continental shelf do not affect the legal status of the superjacent waters as high seas, or that of the air space above those waters.

On this subject, that is to say, the geographic extent and the character of the jurisdiction of the coastal nation, the House of Delegates of the American Bar Association in 1968 adopted a resolution, its full text is annexed. It recommends:

That the United States consult with other parties to the 1958 Continental Shelf Convention with a view to establishing, through the issuance of parallel declarations or by other means, an agreed interpretation of the definition of the boundary between the area of exclusive sovereign rights with respect to natural resources of the seabed and subsoil and the deep ocean floor beyond the limits of national jurisdiction.

The House of Delegates' resolution went on to recommend:

That within the area of exclusive sovereign rights adjacent to the United States, the interests of the United States in the natural resources of the submarine areas be protected to the full extent permitted by the 1958 Convention on the Continental Shelf.

The supporting report of the sections that underlay this resolution, and was before the house of delegates when it adopted it, said this:

The Convention's definition of the seaward extent of the coastal State's jurisdiction has been subjected to a number of interpretations.

Some argue that the factor of exploitability would carry the coastal nation's exclusive mineral jurisdiction to mid-ocean. We disagree. Others argue that it should be restricted to waters as shallow as 200 meters or 12 miles from shore. We disagree with this, too.

The better view, in our opinion, is that the "exploitability" factor of the Convention is limited by the element of "adjacency." The exclusive sovereign rights of the coastal nations to the exploration and exploitation of the natural resources of the seabed and subsoil encompass "the submarine areas adjacent to the coast but outside the area of the territorial sea." According to this view, therefore, the exclusive sovereign rights of the coastal nations with respect to the seabed minerals now embrace the submerged land mass of the adjacent continent down to its junction with the deep ocean floor, irrespective of depth.

In a footnote to my prepared statement I point out that in our 1969 draft report, which will soon be submitted to the respective councils, we say that there may well be a difference of opinion as to whether the 1958 convention should be construed as saying that the jurisdiction of the coastal nations now, underscoring "now," embraces the area down to this junction with the deep ocean floor, or whether, on the other hand, it should be construed simply as carving out and protecting the exclusive right, the exclusive option, of the coastal nation to extend its jurisdiction out to that limit progressively as technology permits exploitation at greater and greater depths. Many of us feel that it does not matter greatly whether the outer limit of exclusive sovereign rights of the coastal nation is characterized as a boundary of rights heretofore vested in the coastal nation, or as a limit on jurisdiction to be acquired in futuro by exploitation at greater and greater depths, because in either event article 2 of the convention stipulates that occupation and exploitation by any other state of the area within this outer limit is prohibited. This outer limit, as I shall develop in a moment, is, we think, the junction of the continental landmass with the deep ocean floor, far beyond the 200-meter depth line.

Out to this limit, we are dealing with an area which is now within the exclusive field of interest of the United States. Whether or not it is characterized as being territory in which the sovereign rights of the United States are now vested, it is clearly an area from which all other nations are excluded, and which is reserved exclusively for exploitation under the authority and license of the United States, as the advance of technology makes such exploitation possible.

I continue now with the quotation from the report of the sections in 1968 as to why the maximum rights under the Continental Shelf Convention should be asserted and defended by our Government. I quote:

If the minerals underlying the seabed adjacent to our coasts remain under American control, as they now are under the Continental Shelf Convention as we construe it, they continue to be resources available for national defense, essential components of the American economy, and important elements of the Federal and State tax base.

We do not believe that it is in the interests of the United States that negotiations for the creation of an international regime to govern mineral development of the ocean floor should proceed on the assumption that this new regime will have authority to take over the administration of, or the governmental revenues derived from, the development of the minerals or any part of the submerged segments of the American continent.

In our opinion, the United States should stand on its rights under the Convention as heretofore ratified.

If legal uncertainties are believed to constitute an impediment to utilization of undersea mineral resources, such uncertainties can be eliminated by uniform declarations of the coastal nations which are parties to the Convention on the Continental Shelf, identifying their claims of jurisdiction with the submerged portion of the continental land mass, and reciprocally restricting their claims accordingly. No new conference to amend the Continental Shelf Convention is necessary to accomplish this.

I referred earlier to the 1969 draft report of these same sections, which will go before the respective councils next week. In this draft report, the lawyers who have been studying this matter exhaustively for the past several months say this:

We reaffirm our opinion that the concept of adjacency contained in the present Shelf Convention should properly be interpreted to include the submerged con-

tinental land mass. In the view widely held among our members, all of the submerged continental land mass is subject to national jurisdiction over its natural resources. In the view of a significant number of our members any part of this land mass will come within national jurisdiction as soon as it becomes accessible to exploitation.

We reaffirm our opinion that it would not be desirable, in terms of overall United States interests, to seek a formal international conference for the purpose of fixing a precise boundary for the legal shelf. We believe it both preferable and proper to achieve this aim through parallel declarations by interested states announcing a uniform interpretation of the criteria embodied in the 1958 Convention.

We reaffirm our opinion that the United States should assert to the full rights over adjacent submarine areas now vested in it by the Shelf Convention and by general international law.

We reaffirm our opinion that claims to rights in excess of those recognized in the Shelf Convention (such as rights over the superjacent waters, non-sedentary fisheries, or airspace) are invalid extensions of the continental shelf doctrine, and should be so regarded by the United States.

The position stated in these comments necessarily leads us to disagree with recommendations of the Commission on Marine Science Engineering and Resources "... that the United States should take the initiative to secure international agreement on a seaward limit for the legal shelf at the 200-meter line (or 50 miles offshore, whichever is greater). Both these limits have now been exceeded in practice, and they must be regarded as obsolete. We also disagree with the proposed initiative to seek international agreement if this means the convocation of a formal conference for that purpose."

Now, Mr. Chairman, I turn to the second subject of discussion; namely, mineral resources seaward of the limits of national jurisdiction. Beyond the limits of national jurisdiction, what international arrangements should govern mineral development?

On this point the House of Delegates' recommendation in 1968 said this:

That on the basis of the information now available, the most desirable long-range goal for a regime to govern exploration and development of the mineral resources of the seabed and ocean floor and subsoil beyond the limits of national jurisdiction is not the creation of a supersovereignty with power to grant or deny mineral concessions, but rather agreement upon norms of conduct designed to minimize conflicts between sovereigns which undertake such exploration and development.

That the resources of the bed and subsoil of the deep sea, beyond the limits of national jurisdiction, be the subject of a study and consultation with a view to formulating rules and practices to be observed by common restraint or by other arrangements which will assure, *inter alia*, freedom of exploration by all nations on a nondiscriminatory basis, security of tenure to those engaged in producing the resources in compliance with such rules, encouragement to discover and develop these resources, and optimum use to the benefit of all peoples . . .

The Marine Science Commission report recommends an International Registry Office, in which nations shall register their claims to the deep sea bed, on a first in time first in right basis. On this, our 1969 joint report says:

Our 1968 Report (pp. 12-13) suggested consideration of a registry scheme as a long-range objective in contrast with proposals for vesting jurisdiction in a supranational agency to grant or deny mineral concessions in the areas beyond national jurisdiction. We consequently approve the Commission's similar conclusion, which avoids vesting of title to deep-sea resources in the United Nations (p. 147) and which seeks to create an administrative organ of limited but useful scope. In varying degrees, however, we have misgivings over specific details of the Commission's proposal, including the following:

(1) The structure of the Authority. Its organization must reflect the realities of ocean capabilities, and must be insulated from caprices of the moment in the General Assembly.

(2) The power of the Authority to veto claims and to fix their size and duration. In order to avoid the abuses which can arise from monopoly power, the rights of claimants in all essential respects should be established in the treaty creating the regime.

(3) The denial of any re-registration preference to a state which had developed the area concerned. Such a policy could seriously impair incentive to exploit.

(4) The provisions that claims must be registered by a state or states. This presents problems in situations where private enterprise has invested in preliminary exploration and seeks to perfect its rights in an area before claim-jumpers can take advantage of its work. It should be made certain that the principle of first-come, first-registered" would apply as of the date the applicant gave proper notice to the Authority that it had filed with a member state an application that it register on the applicant's behalf.

(5) The standard of an adequate return. This is a difficult and unrealistic concept to apply to the extractive industries, where risks are high and many unsuccessful attempts have to be paid for out of the small percentage of successful ventures.

(6) Scientific research. Care must be exercised to prevent the registration system from being used to impede genuine scientific research.

(7) The concept of 'paper claims,' i.e., speculative registrations. A speculative race to the registry office, a 'race to grab,' is inevitable if the reward for being first in line, without any prior exploratory effort, is to receive a power to exclude all others from a large area for a period of several years. Experience with mineral laws on land has proven this.

Under the 1968 Resolution of the House of Delegates, the American Bar Association is committed to support the development as soon as practicable of international arrangements to govern the exploitation of deep-sea resources beyond the limits of national jurisdiction. Such arrangements, the Resolution affirms, must assure, *inter alia*, "... freedom of exploration by all nations on a nondiscriminatory basis, security of tenure to those engaged in producing the resources in compliance with such rules, encouragement to discover and develop these resources, and optimum use to the benefit of all peoples. . . ."

Except for the intermediate zone proposal, and subject to the various *caveats* expressed in the foregoing comments, we believe that the Commission's recommendations for a deep-sea regime are broadly in harmony with the principles of the Resolution.

We would reiterate our belief, however, that the details of the Commission's proposed registry plan need careful attention before being submitted as a basis for international discussions. There are, in our opinion, too many loose ends and loopholes which might permit abuse in connection with the requirements for the registration, maintenance and vacating of claims. We are all against a race to grab. It is difficult at present for anyone to grab the deep seabed physically but the concept of registration of paper claims would for the first time create the mechanism to make such a grab possible. Obviously safeguards against such a possibility must be drawn with the utmost care, but the factual data necessary for meaningful draftmanship are not yet available.

Many of our members strongly believe that the first step, in setting up a deep sea regime, should not be the establishment of a system which recognizes paper claims or purely speculative registrations, but should be, instead, agreement on norms of conduct to be observed by the nations capable of carrying out deep-sea mineral exploration.¹ Such norms would be designed to minimize interference between expeditions or operators, and to preclude jumping of areas which are under actual exploration or development, plus reasonable protective margins. This, they believe, may well evolve into a more formal system of registry of claims, but only after enough information has been acquired to make possible an agreement on criteria with respect to areas, duration, diligence requirements, and other factors historically associated with mining rights. Such consensus on norms of conduct should be without prejudice to any agreement to dedicate some portion of the value of production from deep-sea mineral resources to agreed international purposes.

The Commission also proposes an "Intermediate Zone." Our 1969 report contains the following description and comment:

¹ This concept was referred to in our 1968 Joint Report.

In the Commission's view, mineral resources of the deep sea do not in fairness or law belong to the coastal states to the exclusion of other states from their benefits.

However, the Commission recognizes that some coastal states may regard themselves as having preferential rights to resources of a reasonable subsea area beyond the treaty shelf and also have a national security interest in adjacent offshore areas. For these reasons, some coastal states might be reluctant to agree to a narrow treaty shelf without recognition of their particular interests in the area immediately beyond.

As a compromise of the foregoing opposing views, the Report recommends the creation of an intermediate zone of seabed, seaward of the treaty shelf as defined by the Commission, to the 2,500 meter isobath or 100 nautical miles from the baseline of the territorial sea, whichever gives the greater area. The boundary would be permanently fixed as in the case of the shelf. The Commission assumes that the 2,500 meter isobath is the average depth at the foot of the geological continental terrace or slope and 100 miles is the average width of the shelf and slope or terrace. (Geologists do not all agree that these assumptions are true or relevant).

Only the coastal state or its licensees would be authorized to explore and exploit resources therein. It need not do so, but if it does so, its claims must be registered with the Authority and would come under the other terms and conditions of the international regime.

Comment

This proposal is essentially an effort by the Commission to propitiate the proponents of a broad treaty shelf. Many of the arguments summarized earlier with regard to the proper limit of the shelf are also applicable, pro and con, to this intermediate zone concept. If the Commission's intermediate zone proposal were adopted, in conjunction with a narrow shelf, foreign coastal nations would have exactly the same power to exclude American companies, or to demand burdensome concession terms, as they would have if their jurisdiction were commensurate with a broad shelf extending to the 2,500 meter isobath or other outer limit of the proposed intermediate zone. Such a zone has, however, other drawbacks, of which the most weighty is perhaps its sheer awkwardness. Areas subject to divided responsibility are rarely viable, as the history of condominium and internationalized zones in international law indicates.

On balance, we are opposed to this proposal.

An alternative proposal which has been put forward would call for complete coastal state authority over the zone but would provide for some kind of payments to the International Fund. Such an arrangement would be less objectionable, but it might lessen the incentives to the coastal state and its licensees to push on with development. It is also possible to foresee administrative difficulties under this system as well.

In closing, I want to say, Mr. Chairman, that I appreciate this opportunity to present the views of the American Bar Association and of certain of its sections and committees. I again caution that the bar association speaks only through resolutions of the house of delegates. The additional items that I read to you from reports represent the views of the sections. What I have interpolated, and shall say in answer to your questions, represents my own views. I do ask leave to include as part of my statement three appendices.

Appendix A is a resolution of the house of delegates which is incorporated in the report of the sections.

Appendix B is a legislative history of the 1958 convention on the Continental Shelf which has been prepared under my direction but is not a part of the American Bar Association resolution or reports.

Appendix C is another memorandum prepared under my direction, captioned "Coastal State Mineral Jurisdiction and the Continental Margin: A Survey of National Practice." This is adapted from appendix F to the National Petroleum Council report but is not a part of the resolution or reports I referred to.

If I may add one personal comment, Mr. Chairman, I wish to say that this is not a case of a simple line dividing the views of the Marine Science Commission on the one hand from those of the National Petroleum Council on the other.

Those who believe that the exclusive sovereign rights of the United States encompass the continental landmass down to the deep ocean seabed include committees of the American Bar Association and of the International Law Association. They are entitled to respect for their opinions. I know those lawyers and they are not motivated by selfish interests. They are motivated by the interests of our country.

I say here, as I have said on other occasions, that perhaps there is something to the argument that oil companies or mining companies would be better off if they operated under a lenient international regime off the coast of foreign nations than under licenses granted by that particular country.

But that argument, in my opinion, is irrelevant. What we are concerned with is not the good of individual oil companies or mining companies. What we are concerned with is the welfare of our country. I believe that it is not in the interest of the United States that any portion of the American mineral estate, the exclusive right to explore and exploit the whole submerged continental landmass adjacent to our coasts, should be surrendered or put on the bargaining table for any reason whatsoever, and particularly not merely to obtain advantages for American companies operating overseas.

In saying that, again I repeat, I am voicing the opinion of the committees that have considered this matter and of myself and I am not purporting to represent to you that such a resolution is adopted by the house of delegates. But you are entitled to a comprehensive view and I have attempted to give it to you.

If your record permits I should like to incorporate the interim report of the American branch of the International Law Association, which reached the same result as the American Bar Association sections. That committee is made up not only of practicing lawyers, but some of the most eminent academic figures in the United States.

Mr. Chairman, I thank you.

Mr. LENNON. Thank you for a very fine statement, and without objection the request made to insert in the record the documents referred to by the gentleman will be acknowledged and they will be inserted in the record.

(The documents may be found at the conclusion of Mr. Ely's testimony.)

Mr. LENNON. The gentleman from Washington.

Mr. PELLY. Mr. Chairman, I would like to say for myself that I greatly appreciate the testimony that we have had. I think it is going to be a valuable contribution and I wonder, Mr. Ely, whether you would comment on the question I raised with Senator Pell; namely, under the Constitution, to give away or yield any of the property or rights or sovereignty of the United States, would it require an act of both the Senate and the House, or do you think it could be done by Executive agreement or a treaty?

Mr. ELY. I can give only my personal opinion. I believe article IV, section 3, of the constitution controls. It says:

The Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States; and nothing in this Constitution shall be so construed as to Prejudice any Claims of the United States, or of any particular State.

It is not necessary to characterize the property rights of the United States in its continental margin as the equivalent of territorial sovereignty, to bring them within the scope of article IV, section 3, of the constitution, as constituting the subject matter of an exclusive delegation of authority to the Congress, not to the executive.

What is the nature of those rights?

The submerged portion of the American continent adjacent to the United States is the "prolongation" of its territory (to borrow the expression of the International Court of Justice in the North Sea case). This area is, and has been "ab initio" (to again borrow that court's expression), subject to the exclusive sovereign rights of the United States with respect to exploration and exploitation of the resources of those submarine areas. But the convention on the Continental Shelf controls the geographical extent, and the character, of those rights.

Article 1 and article 2 must be read together.

Article 1 establishes a geographical limit on the rights of coastal nations in natural resources of the submarine areas beyond territorial waters, in the form of (1) a minimum related to the 200-meter isobath, and (2) a maximum related to "adjacency" (which, in the light of the legislative history of the convention, I equate with the continental margin, the continental land mass, down to its junction with the abyssal ocean floor, irrespective of depth). If article 2 paragraph 1, stood alone, it would be arguable that the extent of the coastal nation's jurisdiction at any given moment, between these two limits, would be determined solely by the criterion of "exploitability," the capability to occupy and put to use. But article 2, paragraph 2, adds another and controlling factor.

Article 2, paragraph 2, of the convention permanently excludes all other nations from the area between these two limits, whether or not occupied by the coastal nation. The vastly important right of the United States, under article 2, paragraph 2, of the convention to exclude all others from exploration and exploitation of the mineral resources of the continental margin is sometimes overlooked, but it is clear and unequivocal.

The twofold rights of the United States to (1) exclude others from this territory, pending exploitation by the United States, and (2) to exploit, exclusively, this same submerged territory, constitute, in conjunction, highly valuable property rights now owned by the United States. These exclusive rights of the coastal nation, as article 2, paragraph 3, says, are not dependent upon occupation. They do not lapse with time; they are permanently protected, pending the advances in technology required for their exercise.

The value of the minerals of the continental margin, of this component of the American mineral estate thus protected by the convention, is beyond price. Our national survival may be dependent on the control of that asset adjacent to our shores. But, if a value of this Federal property is to be set in money, it can only be estimated in tens, or perhaps hundreds, of billions of dollars. Over \$4 billion has

been received by the Federal treasury from less than 1 percent of the continental margin so far explored.

I am of the opinion that the treaty-making power, which article II, section 2, delegates to the Executive (for exercise with the advice and consent of the Senate), does not override the clear mandate of the property clause of article IV, section 3, so as to delegate to the Executive the power (even with the advice and consent of the Senate) to dispose of property or territory of the United States, a power which article IV delegates to the whole Congress. Similarly, the dedication by treaty of the royalty revenues from the American continental margin to an international organization, as some have proposed, would be subject, in my opinion, to the mandate of article I, section 7, that all bills for raising revenues (hence for appropriating such revenue) shall originate in the House of Representatives.

But the contrary opinion on these points is entitled to respect. It is conceivable that, as a matter of international law, a treaty which relinquished the claim of the United States to the mineral resources of the American continental margin, or dedicated American royalty or tax revenues from this source to an international agency, would be enforceable against this country by other parties to the treaty, even though, as a matter of domestic law, the making of that treaty violated article IV, section 3, and article I, section 7, of the constitution, because the House of Representatives was bypassed.

The very possibility of a constitutional uncertainty of this magnitude adds weight to Congressman Pelly's point that any proposed relinquishment of United States jurisdiction over the maximum area of the continental margin to which we may fairly lay claim, subject to the limitations on that jurisdiction imposed by the convention on the Continental Shelf, should be considered and decided by both Houses of Congress. Why not? At stake is possibly the most valuable property still remaining in Federal possession. National policy, as well as the language of the Constitution, requires the concurrence of the House in its disposition.

Mr. PELLY. Is it too much to hope that maybe the American Bar Association through its appropriate committee would study that problem and maybe pass a resolution expressing its thoughts on that matter?

Mr. ELY. The Bar Association functions through committees that report to sections, and the sections submit recommendations to the House of Delegates, and only the House of Delegates speaks for the American Bar Association.

I would certainly be happy to recommend to the appropriate section that they study this question. What happens beyond that is totally beyond my control.

Mr. PELLY. I can only say that I think I express the feelings of the members of this committee that they would like to fortify their own feelings with regard to the importance of the House of Representatives and their own responsibilities, that we could have such a study and in turn possibly a resolution at the appropriate time.

Mr. ELY. Before I leave, may I call your attention to my appendix B, which deals with the legislative history of the convention. Since you gentlemen deal with legislative history every day, let me point out the

support that it gives for the position of the sections of the American Bar Association that the exclusive sovereign rights of the United States include the entire continental terrace down to its junction with the deep ocean floor, and are not limited to the geological Continental Shelf.

Some time ago the United Nations created the International Law Commission, which is designed to simplify and codify international law. In 1949, the assembly referred to the Commission the question of the codification of the law of the sea.

In 1951, the Commission submitted a partial report in which it recommended that the jurisdiction of the coastal nations should extend to ". . . the seabed and subsoil of the submarine areas contiguous to the coast, but outside the area of territorial waters, where the depth of the superjacent waters admits of the exploitation of the natural resources of the seabed and subsoil."

This contained no 200-meter depth limit at all.

In 1953, the Commission proposed new language which said instead, ". . . the seabed and subsoil of the submarine areas contiguous to the coast, but outside the area of the territorial sea, to a depth of 200 meters," saying nothing about exploitability.

This about-face of the Commission was totally unacceptable to the Organization of American States. The 20 American nations, including the United States, met at Ciudad Trujillo in 1956 and adopted a resolution which insisted there will be added to the 200-meter limit the concept of exploitability, and this was referred back to the International Law Commission, which agreed with it in 1956. In 1958 the Conference on the Law of the Sea adopted the Commission's recommendations, which included this language of exploitability, and it had before it the report of the Commission, saying it was doing so in response to the insistence of the Ciudad Trujillo declaration of the 20 American States.

To refer back to the Ciudad Trujillo declaration, it stated that "The American States are especially interested in utilizing and conserving the existing natural resources on the American terrace (shelf and slope)," and that the exploitation of the continental terrace should be included as a possibility in the declaration of the rights of the American States.

Thereafter, the Convention on the Continental Shelf was referred to the Senate and the President by the State Department and in so doing, the State Department made it clear that the convention did indeed incorporate in its exploitability concept the objective insisted upon at Ciudad Trujillo.

The chairman of the American negotiating team at Geneva was Arthur Dean, and he told the Senate Committee on Foreign Relations:

The clause which protects the right to utilize advances in technology at greater depths beneath the oceans was supported by the United States and was in keeping with the inter-American conclusions at Ciudad Trujillo in 1956. It was included in the I.L.C. 1956 draft.

While no legislative history is conclusive, as you gentlemen know better than I do, this comes as close to it as any I have seen. Our Government has won cases on much weaker legislative history, and ought not to surrender this one.

Mr. PELLY. Mr. Chairman, I would like to thank the witness for a very splendid statement.

Mr. ELY. Thank you.

Mr. LENNON. Mr. Karth.

Mr. KARTH. Mr. Chairman, I merely want to say that Mr. Ely has cleared up in my mind at least this question of national or international jurisdiction as it relates to the exploitation or exploration of mineral resources on the so-called Continental Shelf.

Mr. ELY. Thank you.

Mr. KARTH. Thank you, Mr. Chairman.

Mr. LENNON. Thank you, sir.

Mr. Keith?

Mr. KEITH. Thank you, Mr. Chairman.

I have been most impressed, as have my colleagues, with your grasp of this subject. I am glad that you referred to the legislative history within the bar association deliberations.

I represent Woods Hole, and there appears to be in the scientific fraternity there a strong sentiment for the internationalization of practically everything. I have wondered with reference to these bar association deliberations, whether there is anything in the written record which is not before us, and which would shed light on the opposite point of view?

Mr. ELY. I am not familiar with the Woods Hole record, Mr. Keith. The Marine Science Commission report itself takes issue with the conclusions I have stated. They single out the National Petroleum Council as though it alone advocated a broad shelf, and I have endeavored to make clear today that this is not so. The commission's panel on international law presents its argument for a narrow shelf and for the so-called intermediate zone.

That panel report is written by competent lawyers, and I think is a fair statement of the opposing view.

Mr. KEITH. Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Keith.

Sir, the resolution that is attached to this file that you submitted for consideration of the committee, made by the sections of natural resources law, international and comparative law, and the Standing Committee on Peace and Law through the United Nations, has that been submitted to the House of Delegates of the American Bar Association?

Mr. ELY. Yes. This is the document with the number 73 at the top of it?

Mr. LENNON. Yes.

Mr. ELY. That is the document which went to the house of delegates at the August 1968 meeting and the resolution there incorporated was adopted.

Mr. LENNON. As we have it here?

Mr. ELY. Yes, sir. You will note that this piece of paper incorporates, as the bar association format requires, the recommendations of the sections for the resolution, followed by the resolution, then the report of the sections in support of it.

Mr. LENNON. The gentleman from California.

Mr. HANNA. I thank the chairman.

Mr. Ely, I greet you once again as a legislator. I have been long an admirer of your presentations. You will recall our meeting in the State legislature, when you represented our water interests, and I must say that you bring to this new subject all of those fine qualities I found so admirable in your previous work.

Mr. ELY. Thank you very much indeed, sir.

Mr. HANNA. Mr. Ely, would you care to comment on my suggestion that we ought to go to some extent to emphasize the importance of the development of the law of the sea equally as we have continued to emphasize the development of science and engineering?

It seems to me that we must keep in tandem with the development of science and engineering, this whole area of the law of the sea. Would you care to comment on that?

Mr. ELY. I think you are quite right, Mr. Hanna. As far as the American Bar Association is concerned, within the past several years its activity has been stimulated. We have two sections whose committees have been at work on this general problem of the law of the sea, plus a standing committee. They have concentrated so far, on the problem of submarine mineral resources.

In the past they have devoted considerable attention, as Mr. Pelly may recall, through Mr. Ned Allen's chairmanship of the Committee on Oceanography, to fisheries problems. They are beginning to take up the question of pollution of the sea from onshore sources. This is being considered also by a committee of the International Law Association on which I serve.

We don't deal with a situation of anarchy, of absence of law. There is, of course, a tremendous body of the law of the sea. The admiralty courts of the civilized nations have recognized maritime liens for centuries. The rules of the road at sea are recognized internationally.

There is a vast body of well-settled law governing surface operations. The Convention on the High Seas and the other conventions that resulted at Geneva deal in various ways with the use of the water column.

We are just beginning to grapple with this question of the seabed, and I agree with you that a great deal remains to be evolved. I think that many of us feel that the law ought to move cautiously and in tandem with scientific knowledge, to follow, not precede, the development of factual information.

Many of us are concerned by the efforts to blueprint law for the future that we are really not yet equipped to write. We have, as to the seabed minerals, a confrontation between two very large and unwieldy bodies of law. One is the principle of the freedom of the seas, treating the trackless oceans as available for everyone. The other is the principle of the mining law that security of tenure is essential.

But I agree with you that all phases of this problem need evolution.

Mr. HANNA. I appreciate your comments and I certainly have no point of departure with you in terms of the caution with which we develop law. I think if you look back at some of the statements that I have made, it sounded as if you and I were reading out of the same chapter and verse.

Mr. ELY. I am sure that is true.

Mr. HANNA. I think it is an observation of most practicing lawyers that the law tends to develop out of practical experience, and that is

the best way for the law to develop. I agree with you that if you try to blueprint too much into the future, what is going to effectively control the meeting of peoples and the meeting between peoples and conditions not yet tried, you are on a very unsound foundation.

Mr. ELY. In these bar association reports and that of the American Branch Committee of the International Law Association, you will find the theme developed that for the next 10 or 20 years, perhaps, what is needed to preserve good order is agreement among the major nations which are in fact capable of carrying out operations in the very deep sea that they will operate as good neighbors and not jump each other's claims, or interfere with each other. Out of that, bit by bit, you will be able to develop formal law.

Mr. HANNA. Wouldn't it help if we were able to put into expression in a little more understandable way and to make more readily available some of the great body of existing law of the sea, which many people who are now becoming interested are completely unaware of and therefore come in and create problems that would not exist if they were made more aware of what really exists?

Mr. ELY. I think you have made a very good point.

Mr. HANNA. Thank you, Mr. Chairman.

Mr. LENNON. Mr. Ely, in what you have stated here today you find yourself in disagreement with that part of the Commission's report which suggests an international organization such as we had recommended in IRA, I believe it was, and also you differ with the Senator who was here this morning with respect to the international ownership of certain areas of the sea.

That is a general way of stating it, but that is in substance true; is it not?

Mr. ELY. If I might respond first as to NOAA, as I understand, that is intended to be a wholly domestic reorganization. I have not testified as to that.

Mr. LENNON. I used the wrong word. The recommendation of the witness who preceded you was that in substance he agreed with the governmental structure at the domestic level as well as the Commission aspect, but his statement with respect, and the Commission's report with respect to the ownership by an international organization of some of our seabed beyond the Continental Shelf—you differ with that, don't you?

Mr. ELY. I respectfully differ from Senator Pell's presentation here today in two respects: First, as to what the United States now has; second, as to the wisdom of negotiating a new convention restricting our claims on the continental margin.

First, as to what we now have: In my opinion, the existing national jurisdiction of the United States, in the dual sense of (1) the power to exclude others from exploitation of seabed resources per article 2, paragraph 2, of the convention, and (2) the possession of exclusive sovereign rights to explore and exploit seabed resources, per article 2, paragraph 1, of the convention, now encompasses the whole continental landmass adjacent to our coasts, down to the junction of the continent with the abyssal ocean floor. I base this conclusion on the language of the convention and its legislative history. Some, reading article 1 only with the first paragraph of article 2, not paragraph 2.

argue that the sovereign rights of the coastal nation do not come into existence until, and as, exploration and exploitation proceed at greater and greater depths. But the question of whether those "sovereign rights" of the coastal nation come into existence in futuro, or encompassed the whole area ab initio, is reduced to an exercise in semantics by article 2, paragraph 2, which says that the rights referred to in paragraph 1 of that article "are exclusive in the sense that if the coastal State does not explore the Continental Shelf"—defined in article 1 as the submarine areas adjacent to the coast to a depth of 200 meters, or, beyond that limit to where the depth of the superjacent waters admits of the exploration of the natural resources of the said areas—then "no one may undertake these activities."

To clinch this, article 2, paragraph 3, says that these exclusive rights of the coastal nation to exploit that area, and to exclude others therefrom, are not dependent upon occupation. These are permanently protected rights, no matter how long a time may elapse before exploitation becomes technologically feasible, and they encompass the whole continental margin. This is what the Ciudad Trujillo Declaration meant when it proclaimed the jurisdiction of the American nations over the submarine resources of the whole continental terrace, "from the edge of the shelf to the greatest depths." When the Senate gave its consent to the Convention on the Continental Shelf, it had before it the representation of the State Department that the exploitability language of article 1, "the clause which protects the right to utilize advances in technology at greater depths beneath the oceans was supported by the United States and was in keeping with the inter-American conclusions at Ciudad Trujillo in 1956." This is the present limit on, and international recognition of, exclusive American jurisdiction, and it has no relation to depth of water. This limit is controlled only by the identification of the area as a prolongation of the territory occupied by the United States. This, in short, is what we now have, and it is valuable beyond all estimate. Any new agreement which would establish a limit on American "sovereign rights" to seabed minerals at a line which is landward of the submerged edge of the continent would give away a priceless asset of the American people.

Second, I disagree with proposals for a new convention. If I understand Senator Pell correctly, he does not find in this existing Continental Shelf Convention any limit on coastal jurisdiction. The Commission didn't find any. As I understand Senator Pell, and perhaps I misunderstood him, he would write a new limitation, by a new convention at 550 meters, or some distance from land. The Commission proposes a new agreement—an agreement, presumably to be brought about by a new convention or protocol, at 200 meters or 50 miles from land.

I disagree with both those recommendations for two reasons. First, I think it would be fatal to the interests of the United States to convoke a new conference to replace the existing convention with a new one. We have not the slightest idea what could come out of Pandora's box if it were opened in this way.

Second, I believe that the existing convention does give us rights which these two proposals would surrender, and accomplish nothing in return. If the deep sea regime, beyond the line of national jurisdiction, as proposed by Senator Pell or as proposed by the Commission—

and they are not the same, as I understand them—would be good for us, it would be good for everybody, and we don't have to bargain away any interests of the United States or its own continental margin to secure the acquiescence of other countries in a new deep sea regime that is said to be good for all nations.

I would look upon the deep sea regime as a problem quite separate from whether or not we should give up a portion of the area now within our national jurisdiction. We know that it extends now beyond 200 meters, and beyond 550 meters of depth and beyond 30 miles or 50 miles of linear distance from shore.

When it comes to structuring the deep sea regime the Commission recommends that an organization be created in which shall be lodged power to register claims by nations to specific segments of the seabed, on a basis of first-in-time, first-in-right. Each nation would then develop that area under its own laws and subject to diligent requirements, which, if not met, might forfeit the claim.

In the alternative, other schemes have been brought forward.

Mr. LENNON. How does the American Bar Association feel about that special recommendation that you just referred to?

Mr. ELY. The feeling of our sections in general is that this is on the right track, that the ultimate objective might very well be a registration scheme for national claims as distinguished from the creation of a supersovereignty with power to deny seabed concessions, or grant them on bargaining terms.

Mr. LENNON. Right at that point, how does the American Petroleum Institute feel on this particular point with respect to an international organization such as the United Nations controlling certain areas of our seabed for the use or exploitation for the benefit of undeveloped nations?

Mr. ELY. You are speaking of the National Petroleum Council?

Mr. LENNON. Yes.

Mr. ELY. Although I don't appear for the National Petroleum Council, I did serve on the subcommittee of the National Petroleum Council's Committee on Petroleum Resources Under the Ocean Floor, by invitation. I believe it is fair to say that the National Petroleum Council did not favor the creation of a supersovereignty with the power to grant or deny concessions. I believe it fair to say that it, too, looked toward a registry scheme as the ultimate pattern that should be encouraged.

For the record, this is how the National Petroleum Council Report summarized the Council's position on the two questions of the extent of national jurisdiction, and the regime seaward of national jurisdiction (pp. 10, 11, 12) :

In construing the language of this Convention, the National Petroleum Council concludes that the ultimate jurisdiction of the coastal nation with respect to mineral resources under the ocean floor clearly extends by virtue of the exploitability and adjacency criteria outward to encompass the submerged continent down to its junction with the abyssal ocean floor. The Convention's criterion of adjacency is a limitation upon the exploitability criterion which serves to exclude the abyssal ocean floor from the exclusive resource jurisdiction of the coastal nation, regardless of how exploitable the deposits seaward of the continental block might become. The drafters of the Convention also specifically intended, in fairness to the nations concerned, and used language sufficiently broad to provide that, where the continent drops abruptly to the abyssal ocean floor, their natural resource jurisdiction extends to the nearby portions of the deep ocean to

the extent permitted by the dual criteria of exploitability and adjacency. This interpretation, both for the general and the special case, is supported by the findings of many qualified bodies which have studied the matter, by the history of the negotiation of the Convention, by its legislative history in the U.S. Senate, and by the subsequent practice of coastal nations, including the United States in granting concessions or leases in progressively deeper waters.

While the matter does not appear to have been specifically discussed in the preparatory works leading to the Convention, the language selected would also appear broad enough to permit the United States and other coastal nations, in appropriate cases, to claim natural resources jurisdiction to the median line of semienclosed seas, regardless of their depth, under the same twin criteria of of exploitability and adjacency.

* * * * *

The 1958 Convention on the Continental Shelf clearly confirmed the rights of the United States, and other coastal nations, to jurisdiction of the seabed and subsoil mineral resources of the submerged portion of the continent adjacent to their shores. Thus this jurisdiction extends over the continental shelf, the continental slope, and at least the landward portion of the continental rise. The United States should promptly and forthrightly assert these rights, while recognizing similar rights of other coastal nations. Not to do so—in the light of our present and future energy needs—is risking our vital national interests and security and that of our allies as well.

Certainly no consideration should be given to the relinquishment of any of our legitimate rights to offshore areas confirmed to the United States by the Convention on the Continental Shelf. The petroleum potential of this submerged region is largely unknown, but in many areas it may be substantial. If it is, then the region is of critical importance with respect to this Nation's future energy requirements. Any attempt now to restrict the area of U.S. mineral jurisdiction to less than that already recognized under the Geneva Convention would be patently a needless and dangerous give-away of a vital segment of the American mineral estate, which this Nation cannot afford to relinquish.

It is desirable that the United States and other parties to the 1958 Convention, with such additional nations as care to join them, promulgate parallel uniform declarations along the lines recommended herein, stating the extend of their rights (and the limitations on those rights) under the 1958 Convention on the Continental Shelf.

* * * * *

Beyond the bounds of national sovereignty and the limits of exclusive coastal-nation jurisdiction over subsea mineral resources lie the deeper or more remote oceanic areas constituting more than 80 percent of the total ocean-covered area of the world.

International law imposes no prohibition upon the freedom of a state or its nationals to explore or exploit the resources of the bed of the high seas, if this freedom is exercised with reasonable regard for the interests of other states in their exercise of high-seas freedoms. Although general rules of international law may not be sufficiently detailed to provide the necessary certainty for long-range mineral exploitation in this deep-ocean region, these rules will constitute the legal framework for any introductory activity that may occur for some years to come.

* * * * *

Even though existing international legal principles are sufficient to govern preliminary deep-seabed activities, national regulation in matters of state jurisdiction and national consideration of long-term arrangements concerning the seabed should reflect policies which will encourage rather than deter production, recovery, and use of deep-ocean minerals. These include policy objectives such as (a) encouraging exploration for and production of resources at reasonable consumer cost consistent with a fair return to the investor; (b) encouraging maximum efficient recovery through the use of proper conservation practices; (c) facilitating responsible mineral development on a nondiscriminatory basis; and (d) reconciling competing uses of the environment and minimizing adverse effect of mineral operations on that environment.

In harmonizing competing uses in deep-ocean areas, each use should be considered upon its own merit and significance, and no particular use should be considered as having any *per se* priority over another use.

* * * * *

As previously indicated, it is believed that the greatest immediate interest in offshore petroleum activity will be in areas now under the exclusive mineral jurisdiction of the coastal nations. Thus the assurance that the seaward limits of rights now possessed by coastal nations will continue to be respected is of major current concern to the nations of the world. Over 80 percent of these are coastal states.

Nevertheless, it is appropriate to appraise alternatives as to how exploratory or exploitative activity in deep-ocean areas beyond coastal-state jurisdiction should be legally structured. In this regard there is an inadequacy of knowledge about the natural resources and environment of the deep-ocean floor. Much more information and data will be required before realistic arrangements can be concluded for the promotion of long-range development. Therefore, the National Petroleum Council fully endorses the concept of the International Decade of Ocean Exploration, cooperative international research on the resources of the deep-ocean floor, and cooperative international study leading toward an eventual decision on the most appropriate and effective arrangements.

Meanwhile, present consideration regarding legal arrangements for deep-ocean areas could well be focused upon the formulation of standards of conduct for individual nations and persons engaging in activity pursuant to national license.

A step which might follow would be the establishment of an international registry, to serve as a public record of exploratory activity. It seems premature to move toward the establishment of an international agency with licensing authority.

Mr. LENNON. I note in the last page of this resolution that you say was adopted by the House of Delegates:

c. Establishment of (i) reasonable payments to be made, preferably to the World Bank, by the nation which undertakes mineral development, in areas seaward of coastal mineral jurisdiction, in the nature of registration fees—

Mr. ELY. Excuse me, Mr. Chairman. I should straighten this out at once.

The resolution of the House of Delegates begins on page 1 of exhibit A, annexed to my prepared statement, and ends on page 5. It is followed by the report of the sections, beginning with the word "Report".

Mr. LENNON. I am reading from what you have identified as 73, on page 13 of what you identified earlier as 73, as the recommendation from a committee.

Mr. ELY. Yes. That is correct. Page 13 is not a part of the resolution of the House of Delegates but is a part of a supporting report of the sections. You are correct that the sections did regard favorably the principle of the establishment of reasonable payments to be made by the nations which undertake mineral development in the deep seabed seaward of national jurisdiction into some agency like the World Bank for international purposes, which might be agreed upon, including those for aid to the less-developed countries.

Mr. LENNON. Would you identify for the record the gentlemen whose names are signed to what I understand from you are the conclusions or the recommendations of this panel or section? Mr. Jesse P. Luton, Jr., chairman of the Section of Natural Resources Law—what firm is he a member of and where is he located?

Mr. ELY. Mr. Luton is chief counsel of the Gulf Oil Corp., United States. He is located in Houston, Tex.

Mr. LENNON. How about Mr. Joe C. Barrett, the chairman of the Section of International and Comparative Law?

Mr. ELY. Mr. Barrett, I believe, is a lawyer in general practice.

Mr. LENNON. Where is he located?

Mr. ELY. I will supply that for the record.

(The information follows:)

Mr. Joe C. Barrett is a member of the law firm of Barrett, Wheatley, Smith & Deacon which has offices in the Citizens National Bank Building, Jonesboro, Ark.

Mr. LENNON. Thank you. How about Mr. Eberhard P. Deutsch, chairman of the Standing Committee on Peace and Law Through the United Nations?

Mr. ELY. Mr. Deutsch is a New Orleans lawyer in general practice.

Mr. LENNON. The chances are he is identified with the petroleum interests, isn't he, if he is in New Orleans? What do you think?

Mr. ELY. He has a well-known and distinguished practice. I don't know who his clients are.

Mr. LENNON. The reason I brought that out is that I got the impression that at least one member of the commission who has also been identified with the petroleum interests and a very dedicated and fine gentleman, Mr. Blaustein, with Standard Oil Co., gave me the impression in conversations with him that he thought that they ought to be in some international organization such as the United Nations or some part of the United Nations, an organization that you could deal directly with and wouldn't be under the pressure from the coastal States with which they do business.

I wondered if that view was shared by the petroleum industry generally. Apparently it is not, is it?

Mr. ELY. Let me make this very clear. I don't appear here for the petroleum industry. As to what Mr. Blaustein is describing as being in the interests of the petroleum companies he may well be right, but if that premise is adopted, my position is that it would be against the interests of the United States to sacrifice our existing rights in our own continental margin in order to obtain that kind of advantage for oil companies anywhere. The National Petroleum Council, to its great credit, stated the same position at page 72 of its report.

Mr. LENNON. After the actions in the United Nations a year or so ago with respect to this proposal, and I cannot recall off the top of my head how it was identified, didn't the State Department sort of take that position and sort of lean that way? It seems to me that before either this committee or another subcommittee that I attended, I got the impression that the State Department was sort of leaning generally in that direction.

What is your view on that?

Mr. ELY. I hesitate to attempt from memory to give you an account of the State Department's position. It really would not be fair.

Mr. LENNON. I can certainly say that this committee is grateful to you for your appearance here today, but it seems obvious to me that we would sacrifice much of what we ultimately hope to do unless we called on you frequently for advice and counsel, because this does reflect the thinking of the American Bar Association and particularly related to the particular question with which we are involved here now.

Mr. ELY. Thank you so much, Mr. Chairman. I assure you that the members of these committees and of these sections are devoted and dedicated people who struggled with this question and who will attempt to respond to your inquiries in the future and will be honored to do so.

The thing that must be borne in mind, Mr. Chairman, is that we are dealing with an asset that is priceless. If a value in dollars is to be attached to the American continental margin's minerals, it is measured in the tens of billions of dollars, and there are some values that are beyond all price.

National survival may depend upon having immediately accessible under American control, and not international control, the minerals of the American continental margin. We welcome the fact, Mr. Chairman, that this committee is engaged now in safeguarding this resource.

I thank you deeply for the courtesy shown us today.

Mr. LENNON. We are appreciative and honored by your presence. I am sure that we will utilize your good offices in the future.

Mr. ELY. Thank you, Mr. Chairman.

Mr. LENNON. Thank you very much, Mr. Ely.

Tomorrow, gentlemen, the committee will have the Governor of North Carolina as a witness. Some of you will recall, those of you who represent coastal States, that some year or so ago I suggested to you that you suggest to your Governors and your respective legislatures that they establish by legislative action a Marine Science Council to coordinate the activities in your respective States, and at that time I called on the predecessor of the Governor who appears here tomorrow to do that. He named the council and upon my recommendation the Legislature of North Carolina made it a statutory provision.

They have asked for an opportunity to testify tomorrow and I would appreciate very much if you gentlemen can find an opportunity to visit with us early in the morning and spend as much time as you can. Thank you so much.

Mr. ELY. Mr. Chairman, before we leave, might I have permission to place in your record the 1969 Report of the Sections of the American Bar Association, assuming that they are approved next week at the annual meeting?

Mr. LENNON. We would be delighted to have them. Without objection it is so ordered.

(The 1969 report referred to appears at the close of Mr. Ely's prepared statement, *supra*.)

Mr. ELY. May I also place in the record the interim report of the American branch, International Law Association, on this subject?

Mr. LENNON. Thank you, sir. Without objection it is so ordered.

Mr. ELY. Thank you, sir.

Mr. LENNON. With that, the committee will stand adjourned until tomorrow morning at 10 o'clock.

(The documents mentioned follow herewith:)

NORTHCUTT ELY

SENIOR PARTNER, ELY AND DUNCAN, WASHINGTON, D.C.

Member of the bars of California, New York, District of Columbia, U.S. Supreme Court, Court of Appeals of 2nd, 5th, 9th, and D.C. Circuits.

COUNSEL TO GOVERNMENTAL AND PUBLIC AGENCIES

Executive assistant to the Secretary of the Interior, 1929-33; Chairman of the Technical and Advisory Committee, Federal Oil Conservation Board, 1930-33; Special Assistant Attorney General, State of California, 1953 to date; Special

Counsel, Colorado River Board of California, Department of Water and Power of the City of Los Angeles, Coachella Valley County Water District, Imperial Irrigation District, East Bay Municipal Utility District, with respect to water and power supply problems; counsel to California water interests in interstate negotiations for regional development of the Colorado River (1963-date); General Counsel, American Public Power Association; United States delegate to the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas, Geneva, February 1963; member of the Legal Advisory Committee, Federal Power Commission National Power Survey, 1963; Advisor to the Governments of Saudi Arabia (1962-63), Malagasy Republic (1962), Turkey (1963-65), Thailand (1967), Ethiopia (1968), on drafting of mineral legislation (and Algeria with respect to petroleum agreements with France (1966-67)); to the Governor of Oklahoma (1935) in negotiation of the Interstate Oil Conservation Compact; consultant on conservation matters to various Committees of the National Academy of Sciences, the National Science Foundation, Smithsonian Institution, and Interstate Oil Compact Commission.

UNITED STATES SUPREME COURT CASES

Chief counsel for State of California and California parties in *Arizona v. California, et al.*, 373 U.S. 546 (1963) (Colorado River apportionment); *Tacoma v. Taxpayers of Tacoma*, 357 U.S. 320 (1958) (power development on Columbia River tributary); *American Public Power Association v. Power Authority of the State of New York*, 355 U.S. 64 (1957) (effect of legislation on prior judicial decision); *Washington Public Power Supply System v. FPC*, 387 U.S. 428, 18 L. ed. 2d 869 (1967) (Snake River license controversy); *Madruga v. Superior Court*, 346 U.S. 556 (1954) (admiralty case); of counsel in *Wilbur v. U.S. ex rel. Krushnic*, 280 U.S. 306 (1930) (oil shale); *Arizona v. California*, 283 U.S. 423 (1931) (Hoover Dam injunction case); *Arizona v. California*, 292 U.S. 341 (1934) (perpetuation of testimony); *U.S. ex rel. McLennan v. Wilbur*, 283 U.S. 414 (1931) (closing of public domain to oil prospecting); *United States v. Arizona*, 295 U.S. 174 (1935) (martial law injunction); amicus curiae in *New York v. United States*, 326 U.S. 572 (1946) (taxation); *United States v. Gerlach Live Stock Co.*, 339 U.S. 725 (1950) (reclamation development on San Joaquin River).

PROFESSIONAL COMMITTEES

Member of the Council of the Section of Natural Resources Law, American Bar Association; formerly Chairman, Committee on Water Resources of that Section; Committee on Law of the Sea, Section of International and Comparative Law, American Bar Association; Chairman, Committee on Deep Sea Mineral Resources, American Branch of the International Law Association; member of (International) Committees on Deep Sea Mining and on Water Resources of that Association; member, Technical Subcommittee of National Petroleum Council's Committee on Petroleum beneath the Ocean; Legal Committee, Marine Technology Society.

PROFESSIONAL ORGANIZATIONS

American Bar Association, International Law Association, American Law Institute, American Society of International Law, Inter-American Bar Association, American Judicature Society, Mining and Metallurgical Society of America, Marine Technology Society.

BOOKS

Summary of Mining and Petroleum Laws of the World (U.S. Bureau of Mines, 1961, 2d ed. in preparation); Oil Conservation Through Interstate Agreement (Fed. Oil Conservation Bd., 1933); Oil and Gas Conservation Statutes, Annotated (Fed. Oil Cons. Bd., 1933); The Hoover Dam Documents (H. Doc. 717, 80th Cong., 1948).

CHAPTERS IN BOOKS

Legislative Choices in the Development of Mineral Resources (United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas, Geneva, 1963, Vol. II of U.S. papers, Mineral Resources); Mineral Titles and Concessions (ch. 3 of Economics of the Mineral Industries, A.I.M.E., 1st ed. 1959, 2d ed. 1964); Administration of International River Basins (ch. 4 of Law of International Drainage Basins, Institute of Interna-

tional Law, New York University, 1967); Trends in National Petroleum and Mining Laws (ch. 3 of The Role of National Governments in Exploration of Mineral Resources, Princeton University Conference, 1963); The National Government and the Conservation of Oil and Gas (Part IV of Conservation of Oil and Gas, A.B.A. and Interstate Oil Compact Commission, 1948 and 1958); Oil Reserves Scandal (U.S.) (in Encyclopedia Britannica); The Conservation of Oil (in Readings in The Social Control of Industry, American Economic Society, 1942, reprinted from 51 Harv. L. Rev. 1209 (1938)); chapter on U.S. Petroleum Laws in World Petroleum Legislation (1968).

SELECTED ARTICLES AND PAPERS

The Laws Governing Exploitation of the Minerals Beneath the Sea (Marine Technology Society, "Exploiting the Ocean," 1966); The Limits and Conflicting Uses of the Continental Shelf (Law of the Sea Institute, University of Rhode Island, 1966); The Administration of Mineral Resources Underlying the High Seas (American Bar Assn. National Institute on Marine Resources, 1967); The Oil Shale Industry's Water Problems (Fourth Oil Shale Symposium, Denver, 1967); American Policy Options in the Development of Undersea Mineral Resources (A.B.A. program, "Developing the Resources of the Sea," 1967, reprinted in Vol. 2 International Lawyer, Jan. 1968); Policy Trends in Modern Mineral Legislation (Conference on Conservation of Natural Resources, University of Puerto Rico, 1967); Legal Problems in Development of Water Resources (Princeton University Conference on Engineering and World Water Resources, 1963); Taxation of Interest Paid on Municipal Securities, and Income of Publicly Owned Utilities (House Ways and Means Committee, 1958); Light on the Mexican Water Treaty from the Ratification Proceedings in Mexico (S. Doc. 249, 79th Cong., 2d Sess.); The Relationship Between the Laws Governing Water Rights and Those Governing Other Natural Resources (A.B.A. 1962); America's Water Budget (Investment Bankers Association, 1964); Political Controls of the Quantity and Quality of Water Supply (Southern Water Conference, 1967). Chapters on Federal mineral legislation and decisions in annual reports of Interstate Oil Compact Commission and of Section of Natural Resources Law, American Bar Association.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: In accordance with your kind permission, I enclose, for your record, a copy of the 1969 "Joint Report of the Section of International and Comparative Law, the Section of Natural Resources Law, and the Standing Committee on World Order Under Law of the American Bar Association," adopted by those Sections and that Committee at the August 1969 meeting of the American Bar Association. In my prepared statement, dated August 5, 1969, I referred to this as a draft report, and I am pleased to advise you that it was adopted the following week without substantive change.

Respectfully,

NORTHCUTT ELY.

STATEMENT OF NORTHCUTT ELY

Ely and Duncan
Attorneys at Law
Washington, D. C.

On behalf of the

AMERICAN BAR ASSOCIATION

and the

SECTION OF NATURAL RESOURCES LAW
OF THE AMERICAN BAR ASSOCIATION

(with respect to Joint Reports of that Section, the
Section of International and Comparative Law, and
the Standing Committee on World Order Under Law,
and the Joint Reports of certain Committees of those
Sections)

My name is Northcutt Ely. I am a member of the law firm of Ely and Duncan, of Washington, D. C. I am a member of the Council of the Section of Natural Resources Law of the American Bar Association, and appear here by direction of the Chairman and Council of that Section.

I annex as Appendix A a Resolution (No. 73) of the House of Delegates of the American Bar Association, adopted at its August 1968 meeting.* This is incorporated in a Joint Report of the Sections of Natural Resources Law and International and Comparative Law and the Standing Committee on Peace and Law Through United Nations, recommending that Resolution.

Only the Resolution itself states official policy of the American Bar Association. The balance of the annexed 1968 Joint Report states the supporting argument of the Sections which recommended the adoption of the Resolution.

The Resolution, and the supporting Report, deal with two major subjects:

1. The seaward limit of the exclusive jurisdiction of the United States with respect to exploration and exploitation of submarine mineral resources;
2. The international arrangements which should control the exploration and exploitation of submarine mineral resources, seaward of the limits of national jurisdiction of the coastal nations.

I will discuss these points in the same order. In so doing, I shall make

*The Resolution "authorizes representatives of the Sections of Natural Resources Law and International and Comparative Law and the Standing Committee on Peace and Law Through United Nations to express the foregoing as the views of the American Bar Association to agencies of the Government of the United States and to the Congress of the United States."

reference to a 1969 Draft Report which will be submitted at the August 1969 meeting of the American Bar Association to the Councils of the Sections of Natural Resources Law and International and Comparative Law by the Committee on Marine Resources of the former and the Committee on Oceanography of the latter.*** At the moment (Aug. 5, 1969) this has the status of a Section Committee report. It deals primarily with the recommendations of the Marine Science Commission.

1. Submarine mineral resources within national jurisdiction

The character, and the geographical limit, of the sovereign rights of a coastal nation with respect to the exploration and exploitation of the mineral resources of the seabed are determined by the Convention on the Continental Shelf if that nation is a party to that Convention. The United States is one of 39 nations, 35 of them coastal, which are parties to that Convention.* Some features of the Convention may be regarded as embodying customary international law, recognized by many nations which are not parties to the Convention.**

The articles pertinent to this discussion are Articles 1, 2 and 3, which read as follows:

"Article 1

"For the purpose of these articles, the term 'continental shelf' is used as referring (a) to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural re-

*The legislative history of the Convention on this point is summarized in Appendix B.

**See Appendix C, which summarizes national practice with respect to claims of national jurisdiction over seabed resources:

***The 1969 Joint Report here referred to was approved by the respective Sections and Standing Committee Aug. 11-12, 1969 at the Annual Meeting of the American Bar Association at Dallas, Texas, and appears in this record, infra.

sources of the said areas; (b) to the seabed and subsoil of similar submarine areas adjacent to the coasts of islands.

"Article 2

"1. The coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources.

"2. The rights referred to in paragraph 1 of this article are exclusive in the sense that if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities, or make a claim to the continental shelf, without the express consent of the coastal State.

"3. The rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation.

"4. The natural resources referred to in these articles consist of the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil.

"Article 3

"The rights of the coastal State over the continental shelf do not affect the legal status of the superjacent waters as high seas, or that of the air space above those waters."

Recommendation of the House of Delegates

On this subject, the Resolution of the House of Delegates recommends:

"(1) That the United States consult with other parties to the 1958 Continental Shelf Convention with a view to establishing, through the issuance of parallel declarations or by other means, an agreed interpretation of the definition of the boundary between the area of exclusive sovereign rights with respect to natural resources of the seabed and subsoil and the deep ocean floor beyond the limits of national jurisdiction.

"(2) That within the area of exclusive sovereign rights adjacent to the United States, the interests of the United States in the

natural resources of the submarine areas be protected to the full extent permitted by the 1958 Convention on the Continental Shelf."

1968 Report of the Sections

The 1968 Section Report says this:

"Interpretations of the Convention

"The Convention's definition of the seaward extent of the coastal state's jurisdiction has been subjected to a number of interpretations.

"Some argue that the factor of exploitability would carry the coastal nation's exclusive mineral jurisdiction to mid-ocean. We disagree. Others argue that it should be restricted to waters as shallow as 200 meters or 12 miles from shore. We disagree with this, too.

"The better view, in our opinion, is that the 'exploitability' factor of the Convention is limited by the element of 'adjacency.' The exclusive sovereign rights of the coastal nations to the exploration and exploitation of the natural resources of the seabed and subsoil encompass 'the submarine areas adjacent to the coast but outside the area of the territorial sea.' According to this view, therefore, the exclusive sovereign rights of the coastal nations with respect to the seabed minerals now embrace the submerged land mass of the adjacent continent down to its junction with the deep ocean floor, irrespective of depth."*

*This whole matter has been under further and exhaustive review in 1969 by the Committee on Oceanography of the Section of International and Comparative Law, and the Committee on Marine Resources of the Section of Natural Resources Law. A Draft Joint Report has been prepared for submission to the Councils of the respective Sections at the August 1969 meeting of the American Bar Association. It reaches the same general conclusions as the 1968 Report, but, with respect to the cited sentence of the 1968 text, says:

"The quoted conclusion, which reflects the 'continental margin' interpretation of the Convention, represented and continues to represent an opinion widely held among our members.

"Since the 1968 Joint Report, however, a number of our members have stated that this formulation did not accurately reflect their views. In the opinion of these members, the physical concept of 'adjacency' can persuasively be construed to embrace areas to the foot of the continental margin; but the 'exploitability' concept in the Convention (Footnote continued next page.)

The reasons for retaining in the United States jurisdiction over the widest band of adjacent seabed resources consistent with our international commitments were summarized as follows in the 1968 Report of the Sections to the House of Delegates:

(Footnote continued from previous page.)

vention extends sovereign rights over the seabed beyond the 200-meter line only as technological progress makes exploitation in that area possible in fact. Since exploitation techniques still cannot reach the foot of the continental margin, these members believe it erroneous to say that sovereign rights now embrace that area. To this extent they are unwilling to perpetuate what they regard as a misunderstanding of their position in the 1968 Joint Report.

"Those who take the view that sovereign rights now embrace that area answer that under the existing Convention on the Continental Shelf (1) the coastal State's exclusive sovereign rights encompass any exploitation on the adjoining continental margin, whether that exploitation is effected by its national or by a foreigner; /Article 2 provides that "if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities, or make a claim to the continental shelf, without the express consent of the coastal State," and these rights "do not depend on occupation, effective or notional." / (2) a change in the Convention which would retract this boundary of the area of the coastal State's exclusive interest to a line which is landward of the submerged edge of the continent would deprive the coastal nation of rights now recognized in that State by the existing Convention. This being so, they say that it does not matter greatly (with respect to exploration and exploitation of seabed resources) whether the outer limit of exclusive sovereign rights of the coastal State is characterized as the boundary of rights heretofore vested in the coastal nation, or the limit on jurisdiction to be acquired in futuro by exploitation of successively deeper areas, since, in either event, occupation and exploitation by any other State of the area within this limit is prohibited."

"Importance of the 1958 Convention to the United States

"If the minerals underlying the seabed adjacent to our coasts remain under American control, as they now are under the Continental Shelf Convention as we construe it, they continue to be resources available for national defense, essential components of the American economy, and important elements of the federal and state tax base.

"We do not believe that it is in the interests of the United States that negotiations for the creation of an international regime to govern mineral development of the ocean floor should proceed on the assumption that this new regime will have authority to take over the administration of, or the governmental revenues derived from, the development of the minerals of any part of the submerged segments of the American continent.

"In our opinion, the United States should stand on its rights under the Convention as heretofore ratified.

"If legal uncertainties are believed to constitute an impediment to utilization of undersea mineral resources, such uncertainties can be eliminated by uniform declarations of the coastal nations which are parties to the Convention on the Continental Shelf, identifying their claims of jurisdiction with the submerged portion of the continental land mass, and reciprocally restricting their claims accordingly. No new conference to amend the Continental Shelf Convention is necessary to accomplish this."

1969 Draft Report

The draft 1969 Joint Report, after reviewing the arguments for a "narrow shelf" versus those for a "broad shelf," arrives at these conclusions:

"(1) We reaffirm our opinion that the concept of adjacency contained in the present Shelf Convention should properly be interpreted to include the submerged continental land mass. In the view widely held among our members, all of the submerged continental land mass is subject to national jurisdiction over its natural resources. In the view of a significant number of our members any part of this land mass will come within national jurisdiction as soon as it becomes accessible to exploitation.

"(2) We reaffirm our opinion that it would not be desirable, in terms of overall United States interests, to seek a formal international conference for the purpose of fixing a precise boundary for

the legal shelf. We believe it both preferable and proper to achieve this aim through parallel declarations by interested states announcing a uniform interpretation of the criteria embodied in the 1958 Convention.

"(3) We reaffirm our opinion that the United States should assert to the full the rights over adjacent submarine areas now vested in it by the Shelf Convention and by general international law.

"(4) We reaffirm our opinion that claims to rights in excess of those recognized in the Shelf Convention (such as rights over the superjacent waters, non-sedentary fisheries, or airspace) are invalid extensions of the continental shelf doctrine, and should be so regarded by the United States.

"The position stated in these comments necessarily leads us to disagree with the Commission's recommendation* . . . that the United States should take the initiative to secure international agreement on a seaward limit for the legal shelf at the 200-meter line (or 50 miles offshore, whichever is greater). Both these limits have now been exceeded in practice, and they must be regarded as obsolete. We also disagree with the proposed initiative to seek international agreement if this means the convocation of a formal conference for that purpose."

*Report of the Commission on Marine Science, Engineering and Resources, "Our Nation and the Sea," U.S. Govt. Printing Office, January 1969.

In the next part of this statement we refer to the Commission's recommendations with respect to a deep sea regime, seaward of national jurisdiction. As to other recommendations of the Commission our 1969 Draft Joint Report says:

"Other parts of the Commission's Report contain proposals of significant legal interest which are not discussed here. In particular, the Commission's elaborate proposals for the administrative reorganization of oceanographic activities within the Federal Government have not been dealt with. The omission of any of these matters from the present Joint Report should not be taken as indicating either approval, disapproval, or lack of concern with respect thereto on the part of any of the sections or committees participating herein."

2. Mineral resources seaward of the limits of national jurisdiction

Beyond the limits of national jurisdiction, what international arrangements should govern mineral development?

House of Delegates' recommendation

On this subject the 1968 Resolution of the House of Delegates recommended:

"(3) That on the basis of the information now available, the most desirable long-range goal for a regime to govern exploration and development of the mineral resources of the seabed and ocean floor and subsoil beyond the limits of national jurisdiction is not the creation of a supersovereignty with power to grant or deny mineral concessions, but rather agreement upon norms of conduct designed to minimize conflicts between sovereigns which undertake such exploration and development.

"(4) That the resources of the bed and subsoil of the deep sea, beyond the limits of national jurisdiction, be the subject of a study and consultation with a view to formulating rules and practices to be observed by common restraint or by other arrangements which will assure, *inter alia*, freedom of exploration by all nations on a nondiscriminatory basis, security of tenure to those engaged in producing the resources in compliance with such rules, encouragement to discover and develop these resources, and optimum use to the benefit of all peoples"

1968 Joint Report of the Sections

The supporting 1968 Section Report said, on this subject:

"The Seabed Seaward of National Jurisdiction

"With respect to the minerals of the deep seabed beyond the exclusive jurisdiction of the coastal nations, three observations are in order: First, the problem is less pressing in point of time because most mineral development will continue to take place first in the shallower waters which are within coastal jurisdiction; second, less is known about the abyssal deeps and therefore about the type of regime that would best effectuate their utilization; third, the negotiation of an international agreement to establish a wholly new regime will consume an extended period of time. Based on the

information now available, it appears that the most desirable long-range goal for a mineral regime to govern exploration and exploitation of the mineral resources of the ocean bed and subsoil seaward of the coastal jurisdiction will not be the creation of a supersovereignty with competence to grant or deny mineral concessions. Instead, the desirable goal appears to be an agreement upon norms of conduct by sovereign parties, in order to minimize conflicts between the nationals of the respective sovereigns which sponsor such developments.

"While there were some early comments supporting the idea that the United Nations should step in as a supersovereign of the ocean depths, it would appear that there is no official support for this in the United States. At the same time there also appears to be general agreement, both in and out of government here and abroad, that no state should be permitted to acquire territorial sovereignty over any portion of the deep ocean floor outside the limits of national jurisdiction, but that such ocean floor should be open for exploration and exploitation by all nations. There is also general agreement that a nation which undertakes the exploration and exploitation of mineral resources on and under the deep seabed should be protected in the exclusive right to occupy the areas involved, with due regard to other uses of the marine environment, and without impairment of the high-seas character of the overlying waters.

"We strongly endorse the principle that the ocean floor beyond the limits of national jurisdiction should be open for exploration and exploitation to the nationals of every country in accordance with accepted principles of international law."

Marine Science Commission Recommendation

As previously noted, the Marine Science Commission report ("Our Nation and the Sea," January 1969) proposes a narrow limit on coastal jurisdiction (the 200-meter isobath or a line 50 miles from shore, whichever line encompasses the greater area), proposes a new international agreement to fix this limit, and proposes a moratorium on claims beyond that limit. Our 1969 Draft Joint Report strongly disagrees with all three of these recommendations. Beyond the areas of national jurisdiction, the Commission's report proposes a claim-registration scheme, under which only a state or an associ-

ation of states would be eligible to register a claim but the registrant may choose anyone to do the work or transfer its claim to another state.

All states would be free to engage, or authorize, preliminary investigations to decide whether to register a claim to explore. An exclusive right to explore or exploit would be acquired by registry with an International Registry Authority. The membership of the Authority and manner of choosing its governing body would be specified in the agreements embodying the new framework. "The Authority should find its place in the family of the United Nations but should be as autonomous as the World Bank" (p. 149).

The Authority would be required to register claims on a "first-come, first-registered" basis, without discretion to deny it except on the ground that the explorer or exploiter is not able and willing to develop the claim.

Upon proof of discovery the Authority would be required to register a claim to exploit for a large enough area and for a long enough time (fixed by the Authority) to enable economic operation and assure the producer time to recover his investment and an "adequate return thereon." Failure to comply with work requirements would be ground for revocation.

Upon expiration of the registration period, further exploration and exploitation of the subject resources or area should be subject to the regime as it then exists, without any re-registration preference.

To cover the Authority's administrative costs, it should be empowered to fix registration fees.

Royalties and like revenues would be paid into an autonomous fiscal

agency, such as the World Bank, separate from the registration agency,* and would be available for assistance to the less developed countries.

The Commission report also recommends the creation of an "intermediate zone" of seabed, seaward of the treaty shelf as defined by the Commission (the 200-meter isobath or the 50-mile line), to the 2,500-meter isobath or 100 nautical miles from the baseline of the territorial sea, whichever gives the greater area. The boundary would be permanently fixed as in the case of the shelf. The Commission assumes that the 2,500-meter isobath is the average depth at the foot of the geological continental terrace or slope and 100 miles is the average width of the shelf and slope or terrace. (Geologists do not all agree that these assumptions are true or relevant.)

Only the coastal state or its licensees would be authorized to explore and exploit resources therein. It need not do so, but, if it does, its claims must be registered with the Authority and would come under the other terms and conditions of the international regime.

Comments on the Commission's recommendations
for an intermediate zone

Our 1969 Draft Report comments on the intermediate zone scheme as follows:

"Many of the arguments summarized earlier with regard to the proper limit of the shelf are also applicable, pro and con, to this intermediate zone concept. If the Commission's 'intermediate zone' proposal were adopted, in conjunction with a 'narrow' shelf, foreign coastal nations would have exactly the same power to exclude American companies, or to demand burdensome

*Our 1969 Draft Report says: "We endorse the principle here recognized, that the agency concerned with production should be separated from the agency distributing the proceeds."

concession terms, as they would have if their jurisdiction were commensurate with a 'broad' shelf extending to the 2,500 meter isobath or other outer limit of the proposed intermediate zone. Such a zone has, however, other drawbacks, of which the most weighty is perhaps its sheer awkwardness. Areas subject to divided responsibility are rarely viable, as the history of condominium and internationalized zones in international law indicates.

"On balance, we are opposed to this intermediate zone proposal."

Comments on the Commission's recommendations
for a registry scheme

However, with respect to the general concept of a registry scheme for international claims, our 1969 Draft Report says this:

"Under the 1968 Resolution of the House of Delegates, the American Bar Association is committed to support the development as soon as practicable of international arrangements to govern the exploitation of deep-sea resources beyond the limits of national jurisdiction. Such arrangements, the Resolution affirms, must assure, inter alia,

"... freedom of exploration by all nations on a non-discriminatory basis, security of tenure to those engaged in producing the resources in compliance with such rules, encouragement to discover and develop these resources, and optimum use to the benefit of all peoples"

"Except for the intermediate zone proposal, and subject to the various caveats expressed in the foregoing comments, we believe that the Commission's recommendations for a deep-sea regime are broadly in harmony with the principles of the Resolution.

"We would reiterate our belief, however, that the details of the Commission's proposed registry plan need careful attention before being submitted as a basis for international discussions. There are, in our opinion, too many loose ends and loopholes which might permit abuse in connection with the requirements for the registration, maintenance and vacating of claims. We are all against a 'race to grab.' It is difficult at present for anyone to 'grab' the deep seabed physically but the concept of registration of paper claims would for the first time create the mechanism to make such a 'grab' possible. Obviously safeguards against such a possibility must be drawn with the utmost care, but the factual data necessary for

meaningful draftsmanship are not yet available.

"Many of our members strongly believe that the first step, in setting up a deep sea regime, should not be the establishment of a system which recognizes paper claims or purely speculative registrations, but should be, instead, agreement on norms of conduct to be observed by the nations capable of carrying out deep-sea mineral exploration.* Such norms would be designed to minimize interference between expeditions or operators, and to preclude 'jumping' of areas which are under actual exploration or development, plus reasonable protective margins. This, they believe, may well evolve into a more formal system of registry of claims, but only after enough information has been acquired to make possible an agreement on criteria with respect to areas, duration, diligence requirements, and other factors historically associated with mining rights. Such consensus on norms of conduct should be without prejudice to any agreement to dedicate some portion of the value of production from deep-sea mineral resources to agreed international purposes."

Conclusion

I thank you for this opportunity to appear before your Committee on behalf of the American Bar Association. In closing, let me repeat that only the Resolutions of the House of Delegates become official policy of the Association. The 1968 Joint Report of the Sections represents the views of those Sections. The 1969 Draft Report of the Sections, as of this writing (August 1, 1969), represents the views of the Committees of those Sections which are charged with responsibility in the matters covered by that Draft Report. I personally subscribe to the views stated in the House of Delegates Resolution and the majority views stated in the two Reports.

I shall answer your questions to the best of my ability, but, in so doing, am expressing only my personal opinions with respect to subjects not explicitly covered in the Resolution or Reports to which I have referred.

* This concept was referred to in our 1968 Joint Report.

Annexed to this statement are the following:

Appendix A. Resolution (No. 73) of the House of Delegates of the American Bar Association, together with the 1968 Joint Report of the Sections of Natural Resources Law, International and Comparative Law, and the Standing Committee on Peace and Law Through United Nations.

Appendix B. Legislative History (or "travaux preparatoires") of the 1958 Convention on the Continental Shelf. This memorandum was prepared under my direction, and is submitted for the information of the Committee, but is not a part of the Resolution or Reports referred to.

Appendix C. Coastal State Mineral Jurisdiction and the Continental Margin: A survey of national practice. This is adapted from Appendix F to the National Petroleum Council report, "Petroleum Under the Ocean Floor," (1969). It is not a part of the Resolution or Reports referred to, but is submitted for the Committee's information.

CAUTIONARY NOTE

Only the RESOLUTION(S) presented herein, when approved by the House of Delegates, become official policy of the American Bar Association. Those are listed under the heading RECOMMENDATION(S). Comments and supporting data listed under the sub-heading REPORT are not approved by the House in its voting and represent only the views of the Section or Committee submitting them. Reports containing NO recommendations (resolutions) for specific action by the House are merely informative and likewise represent only the views of the Section or Committee.

AMERICAN BAR ASSOCIATION

**JOINT REPORT OF
SECTIONS OF NATURAL RESOURCES LAW,
INTERNATIONAL AND COMPARATIVE LAW,
AND THE STANDING COMMITTEE ON
PEACE AND LAW THROUGH
UNITED NATIONS**

RECOMMENDATION

The Sections of Natural Resources Law, International and Comparative Law, and the Standing Committee on Peace and Law Through United Nations, recommend that the following resolution be adopted by the House of Delegates:

WHEREAS, the natural resources of the seabed and subsoil under the high seas are becoming, through technological progress, increasingly available to mankind in ways until recently unforeseen; and

WHEREAS, a Committee of the United Nations General Assembly is presently considering "practical means to promote international co-operation in the exploration, conservation and use of the seabed and the ocean floor, and the subsoil thereof, . . . and of their resources"; and

WHEREAS, the United States, as a member of that United Nations Committee, has proposed that the exploration and use of the deep ocean floor be open to all states and their nationals without discrimination and in accordance with international law, and as a corollary of this that the exercise of sovereignty or sovereign rights over any part of the deep ocean floor be ruled out; and

WHEREAS, the treaty known as the 1958 Convention on the Continental Shelf in force between 37 nations, including the United States, recognizes that each coastal state has "exclusive sovereign rights for the purpose of" exploring and exploiting the natural resources of "the sea-bed and subsoil of the submarine areas adjacent to the coast . . . to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas"; and

WHEREAS, it is generally recognized that the definition in the 1958 Convention on the Continental Shelf of the boundary between the area of exclusive sovereign rights and the deep ocean floor needs to be clarified by an agreed interpretation; and

WHEREAS, the House of Delegates, by its Resolution of August 9, 1966, stated that "prior to framing a policy . . .

the United States Government . . . review thoroughly the issues at stake in consultation with representatives of the American Bar Association and others competent in the field of international law, with scientific and technical experts and with leaders of American industry in oceanic development";

NOW, THEREFORE, BE IT RESOLVED, that the American Bar Association

SUPPORTS the efforts being made in and out of the governments of interested states to protect the seabed and subsoil of the deep ocean floor beyond the limits of national jurisdiction from claims of sovereignty or rights of discretionary control by any nation or group or organization of nations;

SUPPORTS the call by the United States Government for internationally agreed arrangements governing the exploitation of natural resources of the deep ocean floor beyond the limits of national jurisdiction to be established as soon as practicable;

RECOMMENDS

(1) That the United States consult with other parties to the 1958 Continental Shelf Convention with a view to establishing, through the issuance of parallel declarations or by other means, an agreed interpretation of the definition

of the boundary between the area of exclusive sovereign rights with respect to natural resources of the seabed and subsoil and the deep ocean floor beyond the limits of national jurisdiction.

(2) That within the area of exclusive sovereign rights adjacent to the United States, the interests of the United States in the natural resources of the submarine areas be protected to the full extent permitted by the 1958 Convention on the Continental Shelf.

(3) That on the basis of the information now available, the most desirable long-range goal for a regime to govern exploration and development of the mineral resources of the seabed and ocean floor and subsoil beyond the limits of national jurisdiction is not the creation of a supersovereignty with power to grant or deny mineral concessions, but rather agreement upon norms of conduct designed to minimize conflicts between sovereigns which undertake such exploration and development.

(4) That the resources of the bed and subsoil of the deep sea, beyond the limits of national jurisdiction, be the subject of study and consultation with a view to formulating rules and practices to be observed by common restraint or by other arrangements which will assure, inter alia,

freedom of exploration by all nations on a nondiscriminatory basis, security of tenure to those engaged in producing the resources in compliance with such rules, encouragement to discover and develop these resources, and optimum use to the benefit of all peoples; and

AUTHORIZES representatives of the Sections of Natural Resources Law and International and Comparative Law and the Standing Committee on Peace and Law Through United Nations to express the foregoing as the views of the American Bar Association to agencies of the Government of the United States and to the Congress of the United States.

REPORT

The House of Delegates of the American Bar Association, on August 10, 1967, adopted Report #97 of the Section of Natural Resources Law which constituted an offer through the Section of the Association's "services and assistance" to the National Council on Marine Resources and Engineering Development and the Commission on Marine Science, Engineering and Resources and an authorization and instruction to the Section "to establish and maintain a continuing liaison with the Council and the Commission to the end that the Section shall prepare and submit to the House of Delegates, for approval, recommendations with respect to the report or reports proposed by the Council or the Commission." The resolution required that the Section collaborate with the Section of International and Comparative Law and the Section of Administrative Law "with a view towards developing joint recommendations and policies" with regard to matters within the official purview of interest of these sections.

The Section assigned responsibility for implementing this resolution to the Chairman of the Section's Committee on Marine Resources. Subsequently, a Consulting Committee on Marine Resources was formed, consisting of representatives of the named sections as well as the Association's Standing Committee on Peace and Law Through United Nations and the Committee on World Peace Through Law.

In the fall of 1967 liaison was established with the Council and the Commission which resulted in the Commission's making inquiry as to a number of subjects affecting the interest of the United States in offshore lands. Work with the Council and Commission is continuing toward the end of assisting in the formulation of a United States policy in these matters. The Council and the Commission have not as yet made any reports or recommendations on these subjects except of the most preliminary nature.

This report discusses some of the issues involved in developing a regime for exploration and exploitation of the mineral resources on and under the floor of the ocean. It also discusses the question of the extent of the area of exclusive mineral resource jurisdiction of the adjacent coastal states.

The matter has taken on some urgency owing to a number of factors. One is the fact that the Convention on the Continental Shelf, to which reference is made later, is, by its terms, subject to amendment after June 10, 1969. Of more immediate concern, however, is the motion submitted to the Twenty-Second Session of the General Assembly of the United Nations by the delegate from Malta. This apparently contemplated establishment of an international agency which would regulate, supervise and control activities on the deep ocean floor beyond the limits of national jurisdiction. Implicit, of course, is the threshold problem of establishing the line between the area of exclusive seabed jurisdiction of the coastal nations recognized by the Convention on the Continental Shelf, and the deep ocean floor seaward of that jurisdiction. This problem is of grave importance to the United States as a coastal nation engaged in major development of the minerals of the submarine continent.

The General Assembly recognized that so far-reaching a suggestion called for profound study and by resolution decided to establish an ad hoc committee "to study the peaceful uses of the seabed and the ocean floor beyond the limits of national jurisdiction." This committee was requested by the resolution to prepare a study for consideration by the General Assembly at its next (Twenty-Third) session. The committee was asked to include in its study "an indication regarding practical means to promote international cooperation in the exploration, conservation and use of the seabed and the ocean floor, and the subsoil thereof." The resolution was adopted on December 18, 1967, by a vote of 99 to 0. The United States voted for the resolution and is one of the members of the ad hoc committee consisting of thirty-five nations.

The Convention on the Continental Shelf

The threshold question, vital to the United States, is the geographical extent of the exclusive rights now vested in the coastal nations, as recognized in the 1958 Convention on the Continental Shelf. The relevant articles of this Convention read:

"Article 1

"For the purpose of these articles, the term 'continental shelf' is used as referring (a) to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas; (b) to the seabed and subsoil of similar submarine areas adjacent to the coasts of islands.

"Article 2

"1. The coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources.

"2. The rights referred to in paragraph 1 of this article are exclusive in the sense that if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these

activities, or make a claim to the continental shelf, without the express consent of the coastal State.

"3. The rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation.

"4. The natural resources referred to in these articles consist of the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil.

"Article 3

"The rights of the coastal State over the continental shelf do not affect the legal status of the superjacent waters as high seas, or that of the air space above those waters."

Interpretations of the Convention

The Convention's definition of the seaward extent of the coastal state's jurisdiction has been subjected to a number of interpretations.

Some argue that the factor of exploitability would carry the coastal nation's exclusive mineral jurisdiction to mid-ocean. We disagree. Others argue that it should be restricted to waters as shallow as 200 meters or 12 miles from shore. We disagree with this, too.

The better view, in our opinion, is that the "exploitability" factor of the Convention is limited by the element of "adjacency." The exclusive sovereign rights of the coastal nations to the exploration and exploitation of the natural resources of the seabed and subsoil encompass "the submarine areas adjacent to the coast but outside the area of the territorial sea." According to this view, therefore, the exclusive sovereign rights of the coastal nations

with respect to the seabed minerals now embrace the submerged land mass of the adjacent continent down to its junction with the deep ocean floor, irrespective of depth.

Importance of the 1958 Convention to the United States

If the minerals underlying the seabed adjacent to our coasts remain under American control, as they now are under the Continental Shelf Convention as we construe it, they continue to be resources available for national defense, essential components of the American economy, and important elements of the federal and state tax base.

We do not believe that it is in the interests of the United States that negotiations for the creation of an international regime to govern mineral development of the ocean floor should proceed on the assumption that this new regime will have authority to take over the administration of, or the governmental revenues derived from, the development of the minerals of any part of the submerged segments of the American continent.

In our opinion, the United States should stand on its rights under the Convention as heretofore ratified.

If legal uncertainties are believed to constitute an impediment to utilization of undersea mineral resources, such uncertainties can be eliminated by uniform declarations of the coastal nations which are parties to the Convention on the Continental Shelf, identifying their claims of jurisdiction with the submerged portion of the continental land mass, and reciprocally restricting their claims accordingly. No new conference to amend the Continental Shelf Convention is necessary to accomplish this.

The Seabed Seaward of National Jurisdiction

With respect to the minerals of the deep seabed beyond the exclusive jurisdiction of the coastal nations, three observations are in order: First, the problem is less pressing in point of time because most mineral development will continue to take place first in the shallower waters which are within coastal jurisdiction; second, less is known

about the abyssal deeps and therefore about the type of regime that would best effectuate their utilization; third, the negotiation of an international agreement to establish a wholly new regime will consume an extended period of time. Based on the information now available, it appears that the most desirable long-range goal for a mineral regime to govern exploration and exploitation of the mineral resources of the ocean bed and subsoil seaward of the coastal jurisdiction will not be the creation of a supersovereignty with competence to grant or deny mineral concessions. Instead, the desirable goal appears to be an agreement upon norms of conduct by sovereign parties, in order to minimize conflicts between the nationals of the respective sovereigns which sponsor such developments.

While there were some early comments supporting the idea that the United Nations should step in as a supersovereign of the ocean depths, it would appear that there is no official support for this in the United States. At the same time, there also appears to be general agreement, both in and out of government here and abroad, that no state should be permitted to acquire territorial sovereignty over any portion of the deep ocean floor outside the limits of national jurisdiction, but that such ocean floor should be open for exploration and exploitation by all nations. There is also general agreement that a nation which undertakes the exploration and exploitation of mineral resources on and under the deep seabed should be protected in the exclusive right to occupy the areas involved, with due regard to other uses of the marine environment, and without impairment of the high-seas character of the overlying waters.

We strongly endorse the principle that the ocean floor beyond the limits of national jurisdiction should be open for exploration and exploitation to the nationals of every country in accordance with accepted principles of international law.

Members of the Committees of the Section of Natural Resources Law and of the Section of International and Comparative Law concerned with the subject of submarine mineral resources, together with members of the Standing Committee on Peace and Law Through United Nations and members of the Committee on Deep Sea Mineral Resources of the American Branch of the International Law Association, have agreed on the following conclusions:

CONCLUSIONS

1. With respect to the gathering of factual information

Full support should be given to the International Decade of Ocean Exploration, now being formulated, and to the continuance of the maximum international cooperation in the acquisition and exchange of information about the ocean floor.

There should not be any embargo on or prohibition of exploration of deep sea mineral resources pending the negotiation of an international agreement relating thereto. To the contrary, all possible exploration, research, and exchange of knowledge should be encouraged. There is no need to prohibit this desirable progress because of uncertainties as to who shall control production, if minerals are discovered.

2. With respect to the area within the exclusive jurisdiction of the coastal nations over submarine mineral resources

Since exploration and exploitation of undersea minerals is likely to occur earlier in the shallower waters of the oceans adjacent to the continents than in the abyssal depths, it follows that if jurisdictional uncertainties arise to impede such operations during the next several decades, such problems will be primarily related to the scope of the mineral jurisdiction which is already vested exclusively in the coastal states by the "exploitability" and "adjacency" criteria of jurisdiction which now appear in the Continental Shelf Convention. This uncertainty, if necessity for its resolution occurs, might be removed by consultation among the major coastal nations which are capable of conducting deep sea mineral development, looking toward the issuance by those states of parallel ex parte declarations. These declarations might appropriately restrict claims of exclusive seabed mineral jurisdiction, pursuant to the exploitability and adjacency factors of the Continental Shelf Convention, to (i) the submerged portions of the continental land mass, or (ii) to a stated distance from the base line, whichever limitation encompasses the larger area. These declarations might appropriately recognize special cases. Two such classifications suggest themselves: (i) in the case of states whose

coasts plunge precipitously to the ocean floor (e.g., on the west coast of South America), the limit on seabed mineral jurisdiction would automatically operate on the deep ocean floor; (ii) in the case of narrow or enclosed seas, the principle of adjacency might appropriately carry coastal mineral jurisdiction to the median lines, even though these are beyond the continental blocks.

This proposal should not necessitate any amendment of the text of the Continental Shelf Convention. That Convention's differentiation between the coastal state's exclusive rights in seabed minerals, on the one hand, and, on the other hand, the non-exclusive status of the seabed with respect to research and other uses not related to mineral exploitation, would be retained. So also with the Convention's preservation of the high-seas status of the overlying waters.

It would, however, be both appropriate and desirable to reiterate these understandings in the recommended declarations. In the instance of scientific research, which is being increasingly impeded by the requirement of coastal consent for research undertaken on the continental shelf, these parallel declarations might be employed to secure greater protection for this vital activity.

3. With respect to the regime which should be applicable to the minerals in and under the seabed, seaward of the limit of the coastal state's exclusive jurisdiction

(1) On the basis of the information now available, we do not think jurisdiction should be vested in the United Nations or in any other international organization to administer an international licensing system with power to grant or deny exploration and production concessions with respect to these resources.

(2) We think there should be created an international commission (including adequate representation of the maritime powers now engaged in oceanic research and mineral exploration), or vesting responsibility in an existing commission so constituted, with instructions to draft a convention (subject, of course, to ratification) which shall have as its objectives:

a. Creation of an international agency with the limited functions of (i) receiving, recording, and publishing notices by sovereign nations of their intent to occupy and explore stated areas of the seabed exclusively for mineral production, notices of actual occupation thereof, notices of discovery, and periodic notices of continuing activity, together with (ii) resolution of conflicts between notices recorded by two or more nations encompassing the same area.

b. Establishment of norms of conduct by sovereign nations with respect to the recording of the notices proposed in the preceding paragraph, and in the occupation of the seabed and exploration and production of minerals therefrom. The drafting commission could appropriately recommend for inclusion in the resulting convention, among other things, standards (or a mechanism to establish standards) relating to permissible areas for inclusion in exploration and production phases, periods of exclusive rights of occupancy, requirements of diligence as related to tenure, conservation, avoidance of pollution, accommodation with competing uses of the marine environment, etc. The instructions to the negotiating commission should stipulate that the resulting convention shall contemplate that the actual production and marketing of minerals discovered shall be controlled by the laws of the recording nation, and that that nation shall be held accountable for the conduct of those operating under its flag in the exploration and exploitation of minerals.

c. Establishment of (i) reasonable payments to be made, preferably to the World Bank, by the nation which undertakes mineral development, in areas seaward of coastal mineral jurisdiction, in the nature of registration fees, and development fees or royalties, and (ii) the purposes to which such revenues, when received, shall be applied. These purposes should be restricted to international activities on which wide agreement can be reached, such as oceanic research, programs aimed at improved use of the sea's food resources to alleviate protein malnutrition, and the development of the natural resources of the less developed countries.

Jesse P. Luton, Jr., Chairman
Section of Natural Resources Law

Joe C. Barrett, Chairman
Section of International and
Comparative Law

Eberhard P. Deutsch, Chairman
Standing Committee on Peace
and Law Through United Nations

APPENDIX B TO STATEMENT OF
NORTHCUTT ELY

THE LEGISLATIVE HISTORY (OR "TRAVAUX PREPARATOIRES")
OF THE 1958 CONVENTION ON THE CONTINENTAL SHELF^{1/}

The background and history of the Convention comprises primarily these events:

1.

On September 28, 1945, President Truman signed a proclamation^{2/} whose operative language read:

" . . . the United States regards the natural resources of the subsoil and the sea bed of the continental shelf beneath the high seas but contiguous to the coasts of the United States, as appertaining to the United States, subject to its jurisdiction and control. "

The reasons he gave were these:

" . . . the exercise of jurisdiction over the natural resources of the subsoil and sea bed of the continental shelf by the contiguous nation is reasonable and just, since the effectiveness of measures to utilize or conserve these resources would be contingent upon cooperation and protection from the shore, since the continental shelf may be regarded as an extension of the land-mass of the coastal nation and thus naturally appurtenant to it, since these resources frequently form a seaward extension of a pool or deposit lying within the territory, and since self-protection compels the coastal nation to keep close watch over activities off its shores which are of the nature necessary for the utilization of these resources. "

President Truman's proclamation did not relate these reasons to any specified depth of water. At that time, except for wells drilled from piers off California, no offshore well was in production in this country. The first one was brought in, in 50 feet of water, in Louisiana, in 1947.

Some two score nations quickly followed suit with proclamations of offshore jurisdiction.

^{1/} The writer is indebted to Luke W. Finlay, Cecil J. Olmstead, and Oliver L. Stone for access to their research materials in preparing this appendix on legislative history, and the following appendix on national practice. A more complete account appears in the Report of the National Petroleum Council's Committee on Petroleum Resources Under the Ocean Floor, March 1969.

^{2/} The Truman Proclamation of September 28, 1945, titled "Policy of the United States with respect to Natural Resources of the Subsoil and Seabed of the Continental Shelf, " 10 Fed. Reg. 12303.

2.

In 1951 the International Law Commission, which had been established by the Assembly of the United Nations to promote the development and codification of international law, submitted a report on the high seas after its third session. This 1951 report recommended that the coastal nations should have control and jurisdiction over the natural resources of a "continental shelf," defined as referring to

"... the seabed and subsoil of the submarine areas contiguous to the coast, but outside the area of territorial waters, where the depth of the superjacent waters admits of the exploitation of the natural resources of the seabed and subsoil." 3/

3.

The same Commission, in 1953, following its fifth session, produced another report. In this 1953 report the Commission reversed itself, and defined coastal jurisdiction solely in terms of water depth, using 200 metres as the outside limit, as follows:

"... the seabed and subsoil of the submarine areas contiguous to the coast, but outside the area of the territorial sea, to a depth of two hundred metres." 4/

The exploitability criterion was dropped.

4.

This new limitation proved unacceptable to the Organization of American States.

In March 1956, the 20 American nations convened at Ciudad Trujillo to consider the Commission's 1953 draft. These 20 nations were wholly dissatisfied with the International Law Commission's about-face. They unanimously adopted a resolution reciting that:

"The sea-bed and subsoil of the continental shelf, continental and insular terrace, or other submarine areas, adjacent to the coastal state, outside the area of the territorial sea, and to a depth of 200 meters, or, beyond that limit, to where the depth of the superjacent

3/ International Law Commission (ILC) Yearbook (1951), Vol. II, p. 141.

4/ ILC Yearbook (1953), Vol. II, p. 212. The Commission's records make it clear that the motivation for this action was not the conclusion that the coastal nations had no rights beyond the 200 metre depth, but rather that there was no urgency for allowing exploitation beyond that depth, and that a 200 metre depth limit had a desirable element of certainty.

waters admits of the exploitation of the natural resources of the sea-bed and subsoil, appertain exclusively to that state and are subject to its jurisdiction and control." (Emphasis added.) 5/

The conference's report, underlying that resolution, explained "continental terrace" as meaning this:

"... 'Continental terrace' is understood to be that part of the submerged land mass that forms the shelf and the slope." 6/

In turn, it defined the "slope" to mean this:

"... Scientifically, the term 'continental slope,' or 'inclination,' refers to the slope from the edge of the shelf to the greatest depths." (Emphasis added.)

The report made explicit just what the 20 American nations were objecting to in the International Law Commission's proposed restriction of their national jurisdiction to a water depth of 200 metres. It said:

"I. The American states are especially interested in utilizing and conserving the existing natural resources on the American terrace (shelf and slope).

* * *

"III. The utilization of the resources of the shelf cannot be technically limited, and for this reason the exploitation of the continental terrace should be included as a possibility in the declaration of rights of the American states." (Emphasis added.)

The American representative concurred in this report and resolution, with the concurrence of the Department of State. 7/

5/ Resolution of Ciudad Trujillo, Inter-American Specialized Conference on Conservation of Natural Resources; The Continental Shelf and Marine Waters, Ciudad Trujillo; March 15-28, 1956.

6/ Committee I Report, Inter-American Specialized Conference, Conferences and Organizations Series No. 50, Pan American Union, at 34 (March 1956).

7/ Whiteman's Digest of International Law, (Department of State 1965) Vol. 4, p. 837.

5.

In 1956 the International Law Commission convened its eighth session, a few weeks after the close of the Ciudad Trujillo conference. The American position won. The Commission added to its 1953 definition (200 metres) the language proposed by the American nations, which extended coastal jurisdiction "beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources" of said areas. The spokesman for the 20 American nations, having won his point, dropped his request for specific reference to the continental terrace. The official report of the session states it this way:

"... He did not wish to press the part of his amendment introducing the concept of the continental terrace, since the adoption of the second point relating to the depth at which exploitation was practical would automatically bring that area within the general concept." 8/

Professors McDougal and Burke, in their definitive work, "The Public Order of the Oceans," report the 1956 debate in the International Law Commission in this fashion:

"Some controversy attended the suggested elimination of the continental shelf term and the references to the 'continental and insular terrace,' but this became muted when it was realized that a criterion embracing both a 200-meter depth and the depth admitting exploitation would embrace such areas if they were in fact exploitable or came to be." (p. 683.)

The International Law Commission's 1956 report accordingly recommended to the United Nations Assembly draft articles for a convention which would recognize coastal jurisdiction not only to 200 metres (about 100 fathoms), but, as proposed by the American nations, "beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas."

The full text of the language recommended by the Commission to the General Assembly on this subject was contained in Article 67 of a proposed treaty dealing with other phases of the Law of the Sea as well as the continental shelf. It read:

8/ ILC Yearbook (1956), Vol. I, p. 136.

"For the purposes of these articles, the term 'continental shelf' is used as referring to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres (approximately 100 fathoms), or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas."^{9/}

This final report of the Commission to the Assembly emphasized that this was in response to the Ciudad Trujillo declaration of the American states. The Commission said:

"At its eighth session, the Commission reconsidered this provision [i.e., the 200 metre limit agreed on by the Commission in 1953]. It noted that the Inter-American Specialized Conference on 'Conservation of Natural Resources: Continental Shelf and Oceanic Waters,' held at Ciudad Trujillo (Dominican Republic) in March 1956, had arrived at the conclusion that the right of the coastal State should be extended beyond the limit of 200 metres, 'to where the depth of the superjacent waters admits of the exploitation of the natural resources of the seabed and subsoil.' Certain members thought that the article adopted in 1953 [the 200 metre limit] should be modified. . . . While maintaining the limit of 200 metres in this article as the normal limit corresponding to present needs, they wished to recognize forthwith the right to exceed that limit if exploitation of the sea-bed or subsoil at a depth greater than 200 metres proved technically possible. . . . Other members contested the usefulness of the addition, which in their opinion unjustifiably and dangerously impaired the stability of the limit adopted. The majority of the Commission nevertheless decided in favor of the addition."^{10/}

The Commission went on to say:

"While adopting, to a certain extent, the geographical test of the 'continental shelf' as the basis of the juridical definition of the term, the Commission therefore in no way holds that the existence of a continental shelf, in the geographical sense as generally understood,

^{9/} ILC Yearbook (1956), Vol. II, p. 296.

^{10/} ILC Yearbook (1956), Vol. II, pp. 296-97.

is essential for the exercise of the rights of the coastal State as defined in these articles. . . . Again, exploitation of a submarine area at a depth exceeding 200 metres is not contrary to the present rules, merely because the area is not a continental shelf in the geological sense."^{11/} (Emphasis added.)

6.

The United Nations Conference on the Law of the Sea convened in Geneva in February 1958 to consider the recommendations of the International Law Commission. Representatives of 82 nations attended. The conference separated out the Commission's articles into four conventions, one on the High Seas, another on the Territorial Sea and Contiguous Zone, another on the Living Resources of the Sea, and the Convention on the Continental Shelf.

In support of the language recommended by the Commission, with respect to coastal nations' jurisdiction beyond the 200 metre isobath, a member of the American delegation told the Conference:

"The definition of the rights of the coastal State to the continental shelf and continental slope adjacent to the mainland proposed by the International Law Commission would benefit individual States and the whole of mankind."^{12/} (Emphasis added.)

The Conference approved the recommended language of Article 67 of the Commission draft, as Article 1 of the Convention on the Continental Shelf, after eliminating the parenthetical reference to 100 fathoms as equivalent to 200 metres, and adding language making the convention applicable to submarine areas adjacent to the coasts of islands.

In one of the final acts of the Conference, in plenary session, a motion was made to cut coastal jurisdiction back to the 200 metre isobath, as recommended by the Commission in 1953. It was rejected by the Con -

^{11/} ILC Yearbook (1956), Vol. II, p. 297.

^{12/} Official Records of the U.N. Conference on the Law of the Sea, Vol. VI: Fourth Committee, U.N. Doc. A/Conf. 13/42 (1958), p. 40.

ference by a vote of 48 to 20, with two abstentions. ^{13/}

Representatives of our Nation and 45 others then signed the Convention.

7.

Article 11 of the Convention provided that it should come into force on the 30th day following deposit of the 22nd ratification or accession with the United Nations. This required until June 10, 1964. ^{14/}

The State Department submitted the Convention to the President on September 2, 1959. It told him that the Convention "combines both the depth and exploitability tests as did the International Law Commission's draft." ^{15/}

In submitting the Convention to the Senate in 1960 the Department was even more explicit. Its spokesman was Arthur H. Dean, who had been chairman of the United States delegation at the 1958 conference. He told the Senate Committee on Foreign Relations:

"The clause which protects the right to utilize advances in technology at greater depths beneath the oceans was supported by the United States and was in keeping with the inter-American conclusions at Ciudad Trujillo in 1956. It was included in the I.L.C. 1956 draft." ^{16/} (Emphasis added.)

The Senate accordingly gave its consent, and the President ratified the Convention March 24, 1961. ^{17/}

^{13/} Official Records of U.N. Conference on the Law of the Sea, Vol. II: Plenary Meetings, U.N. Doc. A/Conf. 13/38 (1958), p. 13.

^{14/} See Proclamation of President Johnson so stating, May 25, 1964; T.I.A.S. 5578, p. 55. Article 13 provides that after expiration of five years from the date on which the convention enters into force, a request for revision may be made by any contracting party by notice in writing to the Secretary General of the United Nations. This date is thus June 10, 1969.

^{15/} Letter of Acting Secretary of State Dillon transmitting the Convention to President Eisenhower, September 2, 1959.

^{16/} Hearings before the Senate Committee on Foreign Relations, "Conventions on the Law of the Sea," 86 Cong., 2d Sess., Jan. 20, 1960, pp. 108-09.

^{17/} See T.I.A.S. 5578.

Conclusion

Article 2 (1) of the Convention on the Continental Shelf states that the coastal State exercises over the "continental shelf" sovereign rights for the purpose of exploring it and exploiting its natural resources.

Article 1 defined the term "continental shelf" as referring:

" . . . to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas. . . . "(Emphasis added.)

It is clear that the emphasized language (1) was added on the demand of the 20 American states; (2) was in response to their insistence that exclusive coastal jurisdiction should encompass the continental terrace, both shelf and slope, "to the greatest depths"; (3) was concurred in and advocated by the State Department in the 1956 Ciudad Trujillo conference of the American states, with the interpretation that this language accomplished that result; (4) was accepted by the International Law Commission in 1956 as recognizing exclusive jurisdiction in the coastal State in adjacent waters to whatever depth is exploitable; (5) was recommended by the State Department to the 1958 conference which produced the Convention on the Continental Shelf with the explanation that it encompassed both "shelf and slope"; and (6) was represented by the State Department to the President and Senate as being "in keeping with the inter-American conclusions at Ciudad Trujillo in 1956."

APPENDIX C TO STATEMENT OF
NORTHCUTT ELY

COASTAL STATE MINERAL JURISDICTION
AND THE CONTINENTAL MARGIN

Survey of National Practice

To date, 102 nations, 1/ including 98 coastal nations, have recognized the principle of the coastal state's jurisdiction over adjacent offshore mineral resources. Thirty-nine nations (35 of them coastal) have asserted this principle by ratifying the Convention on the Continental Shelf. 2/ The other countries have done so by one or more of the following methods: (1) by domestic legislation, (2) by agreement with other nations, or (3) by granting offshore concessions. 3/

Of the 98 coastal nations which have asserted their general jurisdiction over offshore minerals, at least 37 have done so with respect to specific submarine areas which, according to available information, appear to be beneath waters deeper than 200 metres. In most cases, this has been done by the issuance of deep-water leases; 4/ in others by decree, agreements with neighboring states or offers of such agreements, 5/ or announcements of national policy. 6/ At least 14 coastal nations have

1/ These 102 are identified in Parts I, II, and III of this Appendix. To these 102 nations may be added 5 territories which are partially self-governing, making a total of 107 jurisdictions. See note 9 infra.

2/ These 39 are identified in Part I of this Appendix.

3/ These 63, plus 5 territories which are partially self-governing, are identified in Parts II and III of this Appendix.

4/ 31 nations which have apparently authorized or undertaken development in water deeper than 200 meters are identified in Part IV of this Appendix.

5/ Decrees or international agreements or tenders of international agreements have been found to include water deeper than 200 metres in instances which involve eight nations, in addition to the 31 nations which have issued deep-water leases. These eight are: Chile (200 miles); Dahomey (100 miles); East Germany (Baltic Sea Decree); Ecuador (200 miles); El Salvador (200 miles); Poland (Baltic Sea Decree); Saudi Arabia (Red Sea Decree); U. S. S. R. (Baltic Sea Decree). See also Soviet announcement in the U. N. of drilling in Caspian Sea at depths of 300 to 600 metres (Press release GA/3929, 13 March 1969, p. 4).

6/ For example, Canada.

granted leases which include areas beyond both the 200-metre isobath and 50 nautical miles from shore. 7/

A summary of this national practice appears below. Compilation of this information is complicated by (1) the variety of ways in which assertions of offshore seabed jurisdiction have been made, (2) apparent inconsistencies between law and practice in several nations, and (3) the fact that some nations have asserted seabed jurisdiction by more than one method. This summary is not limited to the practice of members of the United Nations.

ANNEXED LISTS

- I. Parties to Geneva Convention on the Continental Shelf (39)
- II. States, not parties to the Convention, which have made declarations or enacted legislation concerning jurisdiction over the continental shelf (49)
 - A. Adopted the Convention's definition (8)
 - B. Adopted the exploitability criterion (3)
 - C. Adopted other definitions (15)
 - D. Adopted shelf concept in general legislation or proclamation, but no precise definition (23)
- III. Other states and territories, not parties to the Convention, which have granted offshore concessions in apparent absence of general legislation (19)
- IV. States (whether or not parties to the Convention) which have granted offshore concessions for areas in which waters deeper than 200 metres have been provisionally identified (31)
- V. Practice of the United States

7/ These 14 are identified in Part IV of this Appendix.

I. Parties to Geneva Convention on the Continental Shelf (39) ^{8/}

- | | |
|-----------------------|-------------------------|
| 1. Albania | 21. Netherlands |
| 2. Australia | 22. New Zealand |
| 3. Bulgaria | 23. Poland |
| 4. Byelorussian SSR | 24. Portugal |
| 5. Cambodia | 25. Romania |
| 6. Colombia | 26. Senegal |
| 7. Czechoslovakia | 27. Sierra Leone |
| 8. Denmark | 28. South Africa |
| 9. Dominican Republic | 29. Sweden |
| 10. Finland | 30. Switzerland |
| 11. France | 31. Thailand |
| 12. Guatemala | 32. Trinidad and Tobago |
| 13. Haiti | 33. Uganda |
| 14. Israel | 34. Ukrainian SSR |
| 15. Jamaica | 35. USSR |
| 16. Madagascar | 36. United Kingdom |
| 17. Malawi | 37. United States |
| 18. Malaysia | 38. Venezuela |
| 19. Malta | 39. Yugoslavia |
| 20. Mexico | |

II. States, not parties to the Convention, which have made declarations or enacted legislation concerning jurisdiction over the continental shelf (49)

A. Adopted the Convention's Definition (8):

1. Argentina: National Executive Power, Law No. 17,094-M. 24 of 29 Dec. 1966 (U.N. Doc. A/AC 135/11 at p. 10).
2. Germany: Federal Republic: Proclamation on the Continental Shelf, 20 Jan. 1964.
3. Honduras: Congressional Decree No. 21 of the Constituent National Assembly, 19 Dec. 1957.
4. India: Petroleum and Natural Gas Rules, 1959, Art. 3 (U.N. Doc. A/AC 135/11/Add. 1 at p. 13).
5. Italy: Act No. 613 of 21 July 1967, Law for Exploration and Production of Liquid and Gaseous Hydrocarbons in the Territorial Sea and Continental Shelf (U.N. Doc. A/AC 135/11 at p. 38).

6. Morocco: Petroleum Code, Dahir No. 1-58-227, 21 July 1958.
7. U. A. R.: Decree on the Continental Shelf, 3 Sept. 1958 (54 Am. J. Int'l L. 497 (1960)).
8. Uruguay: Decree, 16 July 1963.

B. Adopted the exploitability criterion (3):

1. Brazil: Boletim Especial #196, 20 Oct. 1967, Embassy of Brazil.
2. Norway: Provisional Act of 21 June 1963 relating to the Exploitation and Exploration of Submarine Natural Resources (U.N. Doc. A/AC 135/11 at p. 46).
3. Philippines: Proclamation No. 370 of 20 Mar. 1968 (U.N. Doc. A/AC 135/11 at p. 47).

C. Adopted other definitions (15):

1. Canada: Statement of Canadian representative before U.N. Ad Hoc Committee on March 11, 1968 (U.N. Doc. A/AC 135/1, at p. 33), confirmed by Canadian Embassy, Washington, D.C. ("at least to the abyssal depths").
2. Chile: Presidential Declaration Concerning the Continental Shelf, 23 June 1947 (U.N. Doc. A/AC 135/11 at p. 26); Declaration Over the Maritime Zone, Santiago, 1952, ratified by Decree 432, 23 Sept. 1954 (200 miles).
3. Costa Rica: Article 1 of Decree-Law No. 803 of 2 Nov. 1949 and Article 6 of the Constitution ("submarine shelf and continental base").
4. Dahomey: Decree No. 74 of 7 March 1968 (100 miles) (U.N. Doc. A/AC 135/11/Add. 1 at p. 11).
5. Ecuador: Art. 630, Civil Code, 20 Aug. 1960 (U.N. Doc. A/AC 135/11 at p. 30) (200 metre isobath), but compare Declaration of Santiago, 1952, ratified by Executive Decree No. 275, 7 Feb. 1955 (200 miles), and Supreme Decree No. 1542 of 10 Nov. 1966, amending Art. 633 of Civil Code (200 miles). (Inconsistency in article numbers appears in U.N. and P.A.U. documents).

6. El Salvador: Arts. 1 and 8, Constitution of 1962 (200 miles).
 7. Germany: Democratic Republic: Declaration on the Continental Shelf of the Baltic Sea, Moscow, October 23, 1968 ("the surface and subsoil of the bed of the Baltic Sea as a shallow sea are a continuous continental shelf").
 8. Ghana: Act No. 175, The Territorial Waters and Continental Shelf Act, 19 April 1963 (U. N. Doc. A/AC 135/11 at p. 34) (100 fathoms).
 9. Indonesia: Government Regulations substituting Law No. 44 of 26 Oct. 1960 on the Mining of Petroleum and Natural Gas (Continental Shelf of the Indonesia Archipelago).
 10. Ivory Coast: Offshore Law, Decree 67-334 of 1 August 1967 (200 metres).
 11. Nicaragua: Declaration in May 1949 under Constitution of 1948 (200 metres). Executive Decree of 5 April 1965 (200 miles) appears to apply only to living resources. The Constitution of 1 Nov. 1950 states that the National Territory includes the "continental shelf" and "submerged foundation."
 12. Panama: Law No. 31 of 2 Feb. 1967 (200 miles)
 13. Pakistan: U. N. Legis. Series ST/LEG/SER. B/6, Dec. 1956, at 38 (100 fathoms adopted in 1950).
 14. Peru: Presidential Decree No. 781 of 1 Aug. 1947 (200 miles); Petroleum Law No. 11780 of 12 March 1952 (200 miles).
 15. South Korea: Presidential Proclamation of Sovereignty Over Adjacent Seas, 18 Jan. 1952 (Continental Shelf regardless of depth of water).
- D. Adopted shelf concept in general legislation or proclamation, but no precise definition (23):
1. Bahamas (U. K.): Bahamas (Alteration of Boundaries) Order in Council No. 2574, 26 Nov. 1948.
 2. British Honduras (U. K.): Oil Mining Regulations, 2 Sept. 1949.
 3. Brunei: The Petroleum Mining Enactment, 1963.
 4. Burma: Concession Rules, 1962.

5. Greece: Petroleum Law (Law 3948) of 10 April 1959.
6. Iran: Law of 19 June 1955.
7. Iraq: Proclamation of 24 Nov. 1957 (U.N. Doc. A/AC 135/11 at p. 36).
8. Jamaica: Jamaica (Alteration of Boundaries) Order in Council (No. 2575) of 26 Nov. 1948.
9. Kuwait: Proclamation of 12 June 1949 (U.N. Doc. A/AC 135/11 at p. 39).
10. Libya: Petroleum Law of 1955.
11. Nigeria: Mineral Oil (Amendment) of 17 Dec. 1959.
12. Saudi Arabia: Royal Pronouncement of 28 May 1949; Regulations for the Ownership of Red Sea Resources, Royal Decree No. M/27 of 1 October 1968.
13. Spain: Hydrocarbons Act of 26 Dec. 1958.

Persian Gulf States:

14. Bahrain: Proclamation of 5 June 1949.
15. Muscat & Oman: Offshore activity, Petroleum Press Service, June 1968 at 204.
16. Qatar: Proclamation of 8 June 1949.

Trucial States:

17. Abu Dhabi: Proclamation of 10 June 1949.
18. Ajman: Proclamation of 20 June 1949.
19. Dubai: Proclamation of 14 June 1949.
20. Fujairah: Offshore activity, Petroleum Press Service, July 1966 at 274.
21. Ras al Khaimah: Proclamation of 17 June 1949.
22. Sharjah: Proclamation of 16 June 1949.
23. Umm al Qaywayn: Proclamation of 20 June 1949.

III. Other states and territories, not parties to the Convention, which have granted offshore concessions in apparent absence of general legislation: (Data from announcements and press reports) 9 /

1. Angola (Portugal): Boletim Oficial Sept. 12, 1964. See also Petroleum Press Service, June 1968 at 204. (The jurisdiction of Portugal outside of its territorial seas is set forth in Law 2080 of March 21, 1956. This law applies to all overseas territories of Portugal. Basis II limits concessions to the 200-metre isobath, except "when a special law otherwise disposes.")
2. Cameroon: Petroleum Press Service, June 1968 at 204.
3. Cuba: Concession map of October 1957, reproduced in Barrows, Petroleum Legislation. Presumably expropriated.
4. Equatorial Guinea (Fernando Poo, Rio Muni): See Decreto 1043/1968 of 2 May 1968 re: Rio Muni (published 27 May 1968); Petroleum Press Service, June 1968 at 204.
5. Ethiopia: Several offshore concessions are in effect.
6. Gabon: Decree No. 375 of July 5, 1968.
7. Guyana: Two offshore concessions are in effect.
8. Japan: Petroleum Press Service, August 1968 at 305. Two offshore concessions are in effect.
9. Mauritania: Two concessions are in effect; "Oil & Gas Discoveries," February 1968, at 33-34.
10. Mozambique (Portugal): Petroleum Press Service, Nov. 1967 at 420. See Diario do Governo 11 Oct. 1967, "Bases Anexas ao Decreto," No. 47,990.
11. Somalia: Concession granted 29 May 1961.
12. Spanish Sahara (Spain): Petroleum Press Service, Nov. 1966 at 427.
13. Sudan: Exploration licenses have been granted for deep-water metal-containing brines in the Red Sea.
14. Surinam (Netherlands): Petroleum Press Service, July 1966 at 275.
15. Timor (Portugal): Petroleum Press Service, June 1968 at 204.

9/ Of the 19 jurisdictions listed here, 5 are territories (Angola, Mozambique, Spanish Sahara, Surinam and Timor).

16. Togo: Petroleum Press Service, June 1968 at 204.
17. Tunisia: Petroleum Press Service, Jan. 1967 at 33.
18. Turkey: Three offshore concessions were in effect in 1966.
19. Yemen: One offshore concession was granted in 1961.

IV. States (whether or not parties to the Convention) which have granted offshore concessions, or undertaken development, in areas provisionally identified as including waters deeper than 200 meters

Note a: This listing is based in part on examination of published concession agreements, concession maps, decrees, etc., and in part on unpublished information from sources believed to be reliable.

Note b: In countries marked with an asterisk (*), the seaward boundary of concessions appears to approximate the 100-fathom isobath, but lies beyond that isobath in one or more areas.

Note c: ^{The 100} In countries marked (#), the seaward boundary of at least one concession appears to be beyond the 200 metre isobath and more than 50 nautical miles from shore.

- | | |
|--|--------------------|
| 1. Australia # | 16. Malaysia # |
| 2. British Honduras * | 17. Mauritania * |
| 3. Canada # | 18. Norway # |
| 4. Cuba (concession outstanding in 1957) | 19. Oman # |
| 5. Denmark * | 20. Panama * |
| 6. Equatorial Guinea | 21. Peru * # |
| 7. Ethiopia * | 22. Philippines * |
| 8. Gabon # | 23. Senegal # |
| 9. Ghana | 24. Spanish Sahara |
| 10. Guyana # | 25. Sudan |
| 11. Honduras * # | 26. Surinam # |
| 12. Indonesia * # | 27. Trinidad |
| 13. Italy | 28. Turkey |
| 14. Jamaica * # | 29. United Kingdom |
| 15. Japan # | 30. U. S. A. |
| | 31. U. S. S. R. |

On March 13, 1969, the U.S.S.R. representative stated in the United Nations Committee on the Peaceful Uses of the Seabed Beyond the Limits of National Jurisdiction that, "In the Soviet Union drilling was being carried out in the Caspian Sea at depths of from 300 to 600 metres. . . ." (U.N. Press Release GA/3929, 13 March 1969, at p.4).

V. Practice of the United States

The Department of the Interior, in 1961, granted a phosphorite lease off the California coast in water depths ranging from 240 to 4,000 feet (1,340 metres). This lease was subsequently surrendered. 10/

In 1963 and 1964, the Department issued oil and gas leases in water depths ranging up to 1,500 feet (457 metres). 11/ In 1968, oil and gas leases issued in Santa Barbara Channel included an area in 1,800 feet of water (550 metres).

In 1968, a United States oil company drilled a well in 1,299 feet of water (395 metres), penetrating rock to a depth of 13,622 feet. This well was plugged and abandoned.

The Department has published leasing maps for areas off the California coast as far as 100 miles from the mainland, at depths as great as 6,000 feet. 12/

In 1967, the Department granted a permit to Humble Oil and Refining Company to drill 21 coreholes beneath the Atlantic Ocean in water ranging in depth from 650 feet to 5,000 feet on "the continental slope beyond the continental shelf off Florida and northward to points seaward of Cape Cod and Georges Bank." The areas in which drilling was authorized lie as far as 300 miles from the coast. The permit was not exclusive, and does not include rights to any mineral leases. 13/

10/ Interim Report on the United Nations and the Issue of Deep Ocean Resources, by the Subcommittee on International Organizations and Movements of the House Committee on Foreign Affairs, H.R. Rep. No. 999, 90th Cong., 1st Sess. (1967) at 151. The memorandum opinion of the Associate Solicitor, Department of the Interior, dated May 5, 1961, concerning the application of the Outer Continental Shelf Lands Act to the lease area, is printed in the Interim Report at 165-68.

11/ These leases are listed in the Interim Report at 164.

12/ Barry, The Administration of the Outer Continental Shelf Lands Act, 1 Natural Resources Lawyer 38, 47 (July 1968).

13/ Geological Survey Release, "Core Drilling to Begin on Continental Slope Off Atlantic Coast," (No. 94, 229-67) May 26, 1967.

The United States has asserted jurisdiction over resource development on the Cortes Banks about 100 miles from the California mainland, separated from the mainland by a trench about 1,500 metres deep. 14/

14/ Barry, note 12 supra, at 47.

NON-LIVING RESOURCES OF THE SEA

A Summary and Critique of Chapter 4, Part III of the Report of the Marine Science Commission

Joint Report of the Section of International and Comparative Law, the Section of Natural Resources Law, and the Standing Committee on World Order Under Law of the American Bar Association, August 1969

NOTE.—This Report was approved by the Section of International and Comparative Law, by the Section of Natural Resources Law, and (with the qualifications noted on pp. 6 and 56) by the Standing Committee on World Order Under Law at their meetings in Dallas on August 10–11, 1969. It is not to be construed as representing the opinions or views of the American Bar Association.

Introduction

On January 9, 1969, the Commission on Marine Science, Engineering and Resources, created pursuant to Public Law 89-454 enacted June 17, 1966, submitted its Report to the President and Congress. This report, entitled *Our Nation and the Sea*, is a document of major significance in the formulation of United States policy with regard to all aspects of the sea, its resources, and its uses.

The Commission Report, together with the supporting papers from the Commission's various panels and consultants, is not only a comprehensive study but a positive program for future action. Many of its proposals are controversial, but all represent serious efforts to solve difficult and often novel problems. They merit careful attention from all concerned about national ocean policy.

The present Joint Report is confined to those legal and institutional aspects of the Commission's Report which are of common concern to the Sections and Committees joining herein. It deals with that part of the Commission's Report (chapter 4, part III) which relates to non-living marine resources beneath the sea. In particular, it examines the Commission's proposals regarding an international legal-political framework for the development of such resources in the light of the Resolution on this subject adopted by the House of Delegates of the American Bar Association at its meeting in Philadelphia in August 1968 and the Joint Report submitted to the House of Delegates.¹

Other parts of the Commission's Report contain proposals of significant legal interest which are not discussed here. In particular, the Commission's elaborate proposals for the administrative reorganization of oceanographic activities within the Federal Government have not been dealt with. The omission of any of these matters from the present Joint Report should not be taken as indicating either approval, disapproval, or lack of concern with respect thereto on the part of any of the sections or committees participating herein.

I. THE DEVELOPMENT OF NONLIVING RESOURCES (P. 121)²

The Report of the Marine Science Commission divides non-living marine resources into four categories: oil, gas, hard minerals and fresh water. Recovery of each of these has its unique problems. All have common problems, such as a need for reconnaissance surveys, the role of Federal agencies, and a national and international legal framework.

A. Petroleum (p. 122)

The Report notes that investments of the U.S. offshore oil industry now run more than \$1 billion annually and will grow about 18% per year for the next ten years. Offshore sources on a world-wide basis will probably produce at least a third of world production in ten years. It is unlikely that oil exists in comparable quantities in the deeper ocean basins beyond the foot of the continental terrace or slope.

1. Technical considerations (p. 123)

Regarding technical considerations applicable to petroleum, the Report contains this recommendation (p. 124):

"that appropriate mechanisms be established to assure timely exchange of scientific and technological information among the Federal Government, the petroleum industry and the scientific community consistent with security and proprietary considerations."

¹ The text of the resolution appears in the appendix to the present Joint Report.

² Page numbers in parentheses refer to the printed Commission Report.

We agree generally with this recommendation, but feel that it should be broadened to include other mineral industries as well as the petroleum industry. Moreover, special attention should be given to the phrase "consistent with security and proprietary considerations." Private industry should not be required to make public highly confidential information which it has assembled at high cost, such as interpretations of, and certain classes of, geological and geophysical information. To do so would retard research, development and exploration.

2. *U.S. legal and regulatory considerations (p. 124)*

In discussing legal and regulatory considerations applicable to petroleum, the Report contains this recommendation (p. 127) :

"The Commission recommends that leasing and regulatory policies for offshore oil be geared to a rate of development reflecting all aspects of national interests. Strong support should be given to accomplishing the analysis necessary to provide a basis for decisions on development rates. In scheduling its Federal lease sales the Government should give adequate consideration to industry's need to plan its exploration and development programs in an orderly and effective fashion. For example, it is recommended that longer periods of advance notice be provided for Federal lease sales."

We agree generally with this recommendation. However, as to rate of development, private industry, which will undertake this development, should have a significant voice in the decisionmaking process. With respect to the scheduling of Federal lease sales, we agree that longer periods of advance notice should be provided, but flexibility should be retained so that when companies have expended huge sums of money in conducting geological and geophysical surveys in the offshore areas, they should be afforded the opportunity of bidding on the acreage for the purpose of acquiring leases.

We believe, moreover, that the Federal leasing for oil and gas should have as its principal objective not the short-run maximizing of Federal income, but rather the long term objective of finding and developing adequate petroleum reserves within this nation's control. Experience under the Outer Continental Shelf Lands Act does not indicate that development of oil and gas on the U.S. continental shelf has been too rapid. Because of the declining reserves to production ratio for both oil and gas on the land areas of the United States, a continuing and accelerated effort to discover petroleum reserves in the offshore areas under the jurisdiction and control of the United States is needed in our national interest and security.

B. Natural gas (p. 127)³

The Report points out that offshore gas is chiefly explored for and produced by oil companies. Transportation (in pipelines) is regulated by the Federal Power Commission, and distribution to consumers is regulated by State or local governments. Sales are predicted to increase about 4% per year for the next ten years, and with declining reserves on land it is important to encourage a greater rate of exploration and development. To this end FPC policies should be modified in two respects.

First, with respect to new natural gas pipeline construction, the Report states that the Federal Power Commission should reexamine its policies to determine the extent to which efforts to establish proven reserves result in disclosures adverse to a company, and the FPC should devise methods by which such impact, if any, might be legitimately minimized (p. 128).

We agree with this suggestion.

Second, with respect to wellhead price regulation, the Report recommends (p. 128) :

"that the Federal Power Commission reexamine its differential price policies for natural gas and make such adjustments as it deems advisable to reflect adequately the increased cost of offshore production."

We agree with this recommendation.

With respect to the regulation of interstate natural gas pipelines, the Report also recommends (p. 129) :

"that in order to encourage innovative research and development activities, the Federal Power Commission review its accounting regulations relating to research and development to determine whether such regulations are consistent with the

³ The Standing Committee on World Order Under Law is of the opinion that this section should be deleted on the ground that it largely involves matters beyond the appropriate scope of this report.

legitimate need of the gas transmission industry for clear and realistic guidelines."

We agree with this recommendation.

C. Hard minerals (p. 130)

World demand projections for many key minerals are such that the U.S. must ensure itself an adequate and dependable supply by increasing the rate of discovery. The Commission finds that the present supply outlook does not raise an urgent necessity to develop seabed minerals at maximum speed regardless of cost. However, an early start in offshore exploration and technology development is warranted, and in the Commission's view it is proper for government to play a large role because of the lead time required, the very great costs involved and the diverse nature of the benefits.

1. The Seabed as a Potential Source of Hard Minerals (p. 130)

The Report affirms that for the foreseeable future the economics of extracting metals—other than salt, bromine and magnesium—from sea water are such that there is little likelihood of commercial production.

A more promising source is placer deposits, which are confined mainly to the inner edge of the continental shelf. It is unlikely that significant placer deposits exist on the continental slope or beyond. The Commission states that serious reconnaissance is warranted of the placer prospects off U.S. coasts.

Very little is known about the mineral potential of buried consolidated rock deposits in the substrata of the Continental Shelf and slope. Unless accessible by tunneling from shore or artificial islands, exploration of these deposits lies well in the future.

As to the abyssal ocean floor, the only deposits which now seem to the Commission to have potential economic importance are nodules, crusts and oozes on the ocean floor. The rocks beneath the abyssal ocean floor are far beyond present technical capacity to explore.

We agree with this general estimate of potentialities.

2. The State of ocean mining (p. 132)

The Report notes that the marine mining industry is in its infancy. World-wide there were in 1967 about 300 marine mining operations of all types. All were near shore; almost all were outside the United States. However, U.S. Government agencies and private firms are engaged increasingly in exploration and technological development. But further progress toward commercial exploitation involves overcoming certain economic, technological, and institutional (legal and regulatory) obstacles.

3. Economic Considerations (p. 133)

The Report takes note of the fact that basic economic differences between offshore oil and hard minerals have important government policy implications. Geological structures controlling the distribution of oil deposits generally extend seaward from land. This keeps down the cost of reconnaissance for exploration and of seaward extension of existing technology. This is not so with hard minerals. Also, mineral exploration techniques are more expensive because the horizontal dimensions of mineral deposits are smaller. The steps from discovery to production of minerals involve more effort and more costly technology.

4. Technological Considerations (p. 133)

The steps from discovery to production of minerals offshore involve much effort and novel technology. The lack of operating experience increases the risks of ocean mining ventures. The present practical depth of ore recovery in calm water is 150 feet. Beyond that depth technological activities are thus far exploratory. Technological developments will be very costly. The Commission anticipates that industry will wish to develop mineral recovery technology if the risks against an acceptable rate of return are not excessive; its recommendations are designed to encourage industry to do so, with Government help to the extent required.

To this end the Report recommends (p. 135):

"that strong Federal support be provided for a program to advance the fundamental technology relevant to marine minerals exploration and recovery. Government and industry should work in close cooperation to develop more rapid geophysical exploration tools and improved marine sampling equipment.

The Government should have the function of testing new tools and equipment developed mainly by private industry and in cooperation with industry should be responsible for setting standards for the mining industry."

We understand that some companies in the mining industry agree with this recommendation. The petroleum industry, on the other hand, feels generally that industry, not the Government, should test new tools and equipment which that industry has developed.

5. Legal and Regulatory Considerations (p. 135)

Domestic legal and regulatory considerations are matters of either State or Federal jurisdiction. The Commission recognizes that exploration and development of seabed hard minerals will be a very high risk speculation for the foreseeable future and will require strong State and Federal policy incentives.

The Commission suggests (p. 136) the following guidelines for an offshore mining legal and regulatory regime:

- (1) Encouragement of exploration.
- (2) Maximizing net economic return to the nation rather than maximizing near-term income from rents, royalties or bonuses.
- (3) Recognition that favorable mining laws of other nations compete for U.S. industry investment dollars.

We agree with these general principles.

The Commission refrains from taking a position on the claim-staking system versus the leasing system for hard minerals. But it states that since important questions have been raised before the Public Land Law Review Commission as to the desirability of continuing claim-staking on public lands ashore, it hesitates to recommend extension of this system offshore. At the same time it observes that the procedures established under the Outer Continental Shelf Lands Act "have worked well . . . and should not be lightly abandoned" (p. 136). The Report concludes that diversified situations will call for diversified policies, even if a leasing system is followed offshore. It recommends (p. 137) that

"when deemed necessary to stimulate exploration, the Secretary of the Interior be granted the flexibility to award rights to develop hard minerals on the outer continental shelf without requiring competitive bidding."

We agree with this recommendation, although we reach it from a different direction. Contrary to the Commission's view, the Outer Continental Shelf Lands Act has not worked well in promoting hard mineral development offshore, largely because of the economic burden imposed by its competitive bidding requirements. But regardless of approach, if the legal framework is to promote development, some flexibility in the terms for acquiring rights is highly desirable.

D. Fresh water

As to fresh water resources, the Report recommends that the Department of the Interior continue an aggressive and diversified desalination research and development program (p. 139).

We agree with this recommendation with the observation that cooperative effort between Government and private industry should be encouraged.

E. Preinvestment surveys

The Report recommends that the proposed National Oceanic and Atmospheric Agency undertake reconnaissance surveys and prepare maps of the geological configuration of the continental shelves and slopes adjacent to the United States, such surveys to be conducted by the Government and by industry and universities under contract with the Government (p. 140).

The objectives of this recommendation have merit. Existing technical agencies, particularly the Geological Survey (as the Report notes at p. 141), should be fully utilized in any such effort.

II. AN INTERNATIONAL LEGAL-POLITICAL FRAMEWORK FOR SEABED MINERAL RESOURCES (p. 141)

A. Objectives

Under the heading "An International Legal-Political Framework for Exploring and Exploiting the Mineral Resources Underlying the High Seas," the Report cites (p. 141) as a principal objective of such a framework the principle, first offi-

cially stated by President Johnson, that an international "race to grab and hold lands under the high seas" must be avoided.

This declaration of the President, as the context clearly indicates, referred to the ocean bottoms beyond the limits of national jurisdiction. Thus understood, the objective accords with the paragraph in the 1968 ABA Resolution which supports efforts to protect the deep ocean floor from claims of sovereignty by any nation or group of nations.

Any such framework should also be judged, in the Commission's view, by the extent to which it achieves the following additional objectives (pp. 141-143):

(1) Encourages scientific and technological research, and capital investment for exploration and exploitation, by making it possible for these activities to be carried on in an orderly and economic manner.

(2) Affords a fair chance to all states to engage in minerals exploration and exploitation.

(3) Minimizes the "creation of vested interests that will inhibit changes" in the framework which may be deemed desirable in the light of unfolding experience.

(4) Promotes avoidance of international conflict.

We agree with the first, second, and fourth of these statements. We find the third unclear. If it means that the international framework would result in leases and concessions being subject to revision because of some future change in the regime, we are opposed to it. If it merely means that caution should be exercised in the creation of an immutable legal framework, it is less objectionable.

The Report states that in order for the international framework to achieve the desired objectives it

"must provide means to recognize exclusive claims to explore and exploit the mineral resources of large enough sub-sea areas for long enough periods of time to furnish the incentive to undertake this activity. It must protect recognized claims and at the same time require the relinquishment of claims that are not properly explored or developed within fixed reasonable periods of time. It also must provide for the peaceful settlement of disputes that arise" (p. 143).

These principles are unexceptionable.

B. Adequacy or inadequacy of the existing regime

The Commission concludes (p. 143) that the objectives summarized above cannot be achieved within the existing international framework. In essence, this framework is described as providing that each coastal state presently has exclusive access to the non-living resources of its territorial sea space. It has "sovereign rights" over its treaty continental shelf "for the purpose of exploring it and exploiting its natural resources," but it must not interfere unduly with other uses of ocean space. Beyond the legal shelf, only general principles of law apply, and these are declared to "abound with uncertainty."

The chief areas of uncertainty which deter development are seen by the Commission as two: (1) the seaward boundary of the continental shelf under the 1958 Geneva Convention, and (2) the fact that beyond that line existing principles are insufficient to assure security and protect important national and international interest (p. 146). These will be discussed in turn below.

C. Boundary of the treaty Continental Shelf

1. Text of Articles 1 and 2 of the Convention.

The articles of the Convention on the Continental Shelf particularly relevant to this discussion are Articles 1 and 2, which provide:

Article 1

"For the purpose of these articles, the term 'continental shelf' is used as referring (a) to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas; (b) to the seabed and subsoil of similar submarine areas adjacent to the coasts of islands.

Article 2

"1. The coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources.

"2. The rights referred to in paragraph 1 of this article are exclusive in the sense that if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities, or make a claim to the continental shelf, without the express consent of the coastal State.

"3. The rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation.

"4. The natural resources referred to in these articles consist of the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil."

2. *The Commission's position*

The Commission's conclusion (p. 144) is:

"We do not think that there is any reasonable way to interpret the Convention's definition that would place a precise outer limit on the existing legal 'continental shelf'."

Indeed, the Report goes so far as to indicate that the shelf jurisdiction of the coastal state "up to the 200-meter isobath is not entirely free of doubt because in some parts of the world, the geological continental shelf extends to a depth less than 200 meters yet to a distance so far from the coast that at some point, it may reasonably be argued, it is no longer 'adjacent' to it and, therefore, not within the Convention's definition."⁴

To resolve the problem which it thus finds to exist, the Commission recommends (p. 145):

"That the United States take the initiative to secure international agreement on a redefinition of the 'continental shelf' for purposes of the Convention on the Continental Shelf. The seaward limit of each coastal nation's 'continental shelf' should be fixed at the 200-meter isobath, or 50 nautical miles from the baseline for measuring the breadth of its territorial sea, whichever alternative gives it the greater area for purposes of the Convention."

We disagree. The reasons for our view can best be stated after a brief examination of various arguments advanced by those who support and those who oppose the Commission's position.

3. *Previous Bar Association reports and the NPC report*

The Commission refers generally to other suggested interpretations of the shelf definition contained in the Convention but deems it important (p. 144) to single out and differ especially with the Interim Report of the National Petroleum Council (NPC) dated July 9, 1968.

It would be inappropriate, however, to characterize this as a difference of views solely as between the Commission and the National Petroleum Council.

The Joint Report to the House of Delegates of the Sections of Natural Resources Law and International and Comparative Law and the Standing Committee on Peace and Law through United Nations (August 1968) said (pp. 8-9):

"The Convention's definition of the seaward extent of the coastal state's jurisdiction has been subjected to a number of interpretations.

"Some argue that the factor of exploitability would carry the coastal nation's exclusive mineral jurisdiction to mid-ocean. We disagree. Others argue that it should be restricted to waters as shallow as 200 meters or 12 miles from shore. We disagree with this, too.

"The better view, in our opinion, is that the 'exploitability' factor of the Convention is limited by the element of 'adjacency.' The exclusive sovereign rights of the coastal nations to the exploration and exploitation of the natural resources of the seabed and subsoil encompass 'the submarine areas *adjacent* to the coast but outside the area of the territorial sea.'"

The 1968 Interim Report of the Committee on Deep Sea Mineral Resources of the American Branch of the International Law Association said (p. IX-X):

"For reasons seldom made explicit, some find difficulty with the boundary definition in the Convention, particularly in terms of the reach of the exploitability criterion in light of the principal of adjacency. Accordingly, a number of alternatives are now being advanced in various quarters for revising the Continental Shelf Convention in order to place a firm limitation on coastal control. The Com-

⁴ It seems clear to us that areas out to a depth of 200 metres, regardless of distance from shore, are within the shelf jurisdiction of the coastal state subject to the corresponding rights of other states with which the shelf may be shared.

mittee believes that this assumption of a need to revise the Shelf Convention is unwarranted in terms of projected technological progress in offshore mineral exploitation. Reasonably interpreted, the Convention definition of the shelf extends, and limits, coastal control to adjacent marine regions of sufficient extent that the outer limit of control will not be reached for a very long time.

"As a general rule, the limit of adjacency may reasonably be regarded as coinciding with the foot of the submerged portion of the continental land mass. There is strong support for this view in the drafting history of the Convention, although other interpretations have been advanced."

Our own report, and that of the Committee on Deep Sea Mineral Resources of the American Branch of the International Law Association, joined in substantially identical Conclusions and Recommendations.

The Commission's report does not take specific cognizance of the reports of these Bar groups, but refers exclusively to the NPC report.

The NPC 1968 Interim Report took the position that under the Convention's adjacency and exploitability criteria, coastal nations are vested with exclusive sovereign rights over the natural resources of the submerged continental land mass seaward to the point where the submerged continent meets the deep ocean floor, including the geological continental shelf, continental borderland, continental slope, and at least the landward portions of the continental rise. It further proposed that this interpretation of the Convention be proclaimed through unilateral declarations by the United States and other coastal nations as their understanding of the text.⁵ A more precisely defined boundary based on this principle could be determined later as required.

The Commission Report rejects the 1968 NPC position on both legal and policy grounds. With respect to the NPC's suggested reading of the Convention, the Report observes (p. 144) :

"On the basis of the studies of its International Panel, the Commission concludes that the NPC position is not warranted either by the language of the definition of the 'continental shelf' or its history."

⁵ Subsequent to the Commission Report, the NPC in March 1969 published its final report, entitled, "Petroleum Resources under the Ocean Floor." On this point the text of the final NPC report said (pp. 56-57.) :

"For the purpose of determining the outer limit of coastal-nation jurisdiction, the definition of the 'continental shelf' as set forth in Article 1 of the Convention is controlling. The key words in this definition, in turn, are :

"1. 'Submarine areas,' i.e., not just the continental shelf in its strict geomorphic sense, but any submarine areas lying off the coast and otherwise meeting the requirements of Article 1 ;

"2. 'Adjacent to the coast,' i.e., not to mid-ocean, but in sufficient proximity or appurtenance to the coast to qualify as 'adjacent.' Adjacency is, of course, a relative concept and what is proximate or appurtenant must be determined in the context of the vast expanses of the oceanic submarine areas of the world and not in a narrow sense ;

"3. 'To a depth of 200 metres,' i.e., this far presently and unconditionally, without regard to the existence of a capability to exploit ;

"4. 'Or beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas,' i.e., as much farther beyond the 200 meters depth, within the outer limit of adjacency, as developing technology can be shown at any particular time to make such exploitation possible. In other words, this is not a static limit, conditioned upon exploitability as of a specific point in time, but is an elastic one, expanding with developments in technology.

"It is thus apparent as noted in point 3 immediately above that the coastal nations have (a) a present and unconditional jurisdiction to the depth of 200 meters without regard to the existence of a capability to exploit, and (b) a further jurisdiction over the submarine areas specified in point 4 above whenever developing technology admits of the exploitation of said areas. Article 2, par. 2, of the Convention preserves the exclusive rights of the coastal nations throughout whatever period of time is needed to permit the art of exploitation to achieve its ultimate depth capability within the limits of adjacency. As seems apparent, in light of technological advances to date, there will be an eventual capability to exploit any submarine area. Thus the test of adjacency alone determines the ultimate limit of national jurisdiction of coastal nations under Article 1 of the Convention and hence it is this test that fixes the boundary between national and international jurisdiction.

"Accordingly, it is the outer limit of adjacency which will now be considered.

"When the four key phrases, which have been analyzed above, are considered in light of the deliberations that led to their inclusion in the definition of the term 'continental shelf' in Article 1 of the Convention, it can reasonably be concluded that the coastal nations' exclusive jurisdiction over the natural resources of the seabed and subsoil was intended to, and does, encompass in general, the continental mass seaward to where the submerged portion of that mass meets the abyssal ocean floor (including the continental shelf, continental borderland, continental slope, and at least the landward portion of the continental rise overlapping the slope).

"In addition, it is clear that in particular locales where the continent drops off abruptly from near the coastline to the abyssal ocean floor, it was intended that this exclusive jurisdiction should include an area of that floor 'adjacent to the continent.'"

It then goes on (p. 144) to state the Commission's judgment that the NPC proposal would be "contrary to the best interests of the United States."

The differences of opinion which currently exist over the proper limit of the continental shelf are well brought out by this conflict between the position of the Commission and the positions taken in the 1968 reports of the A.B.A. sections, the I.L.A. Committee, and NPC.

The issue is controversial and complex. Because of its importance, we think it may be informative to review (in necessarily abbreviated form) some of the considerations advanced by the opposing sides and then to indicate the bases of our position. These considerations may be conveniently divided into those relating to the construction of the present Convention language, those involving the question of what is desirable policy, and those concerning the manner in which a more precise definition of the treaty shelf might be obtained.

4. Construction of the convention text

It is common ground between the Commission, the positions of the Bar groups, and the NPC positions that the language of the Shelf Convention does not support the so-called "national lake" concept—that a coastal state may extend its claims indefinitely over the deep-sea floor until it reaches some mid-ocean median line with another state. The differences between them relate to the proper location of a seaward limit for national jurisdiction which is acknowledged to exist.⁶

One body of opinion takes the view that the shelf definition in Article 1 of the 1958 Convention properly interpreted means that the limit of adjacency may be regarded as coinciding with the foot of the submerged portion of the continental land mass. Evidence from the drafting history is cited in support of this interpretation, with particular emphasis being placed on the conclusions of the Inter-American Conference at Ciudad Trujillo in 1956. At that conference a resolution was adopted specifically affirming the exclusive appurtenance to the coastal state of

"The continental shelf, continental and insular terrace, or other submarine areas, adjacent to the coastal state . . . to a depth of 200 meters, or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources . . ." ⁷

Since this resolution was an important precursor of the Shelf Convention, it is said that Article 1 of the Convention should be read as embracing the same concept even though Article 1 omits all reference to the "continental terrace."⁸ Those adhering to this view cite the explanation given to the Senate by the Chairman of the U.S. delegation which participated in the Geneva Convention conferences:

"The clause which protects the right to utilize advances in technology at greater depths beneath the oceans was supported by the United States and was in keeping with the Inter-American conclusions at Ciudad Trujillo in 1956. It was included in the I.L.C. 1956 draft." ⁹

Reliance is also placed on the recent holding by the International Court of Justice in the *North Sea Continental Shelf Cases* that under the continental shelf doctrine as it exists in customary law a coastal state is entitled to "all those parts of the continental shelf that constitute a *natural prolongation* of its land territory into and under the sea." ¹⁰ [Emphasis supplied.]

Opposed to this view is a second body of opinion, exemplified in the Reports of the Commission and of its International Panel, that the drafting history of the Convention does not support this broad interpretation. This group relies, *inter alia*, on the facts that no express reference was made in Article 1 to the continental Terrace or slope, that an effort to include such a reference was voted down in the Conference, and that the drafters retained throughout the basic term "continental shelf."

⁶ It has also become clear in the UN debates on this subject that there is a wide consensus favoring the principle that there is some such limit of coastal state jurisdiction.

⁷ 4 Whiteman, *Digest of International Law*, 836-837. The United States voted for the resolution, which was adopted unanimously.

⁸ The full arguments about the drafting history advanced by the proponents of this view are set forth in detail in the 1968 and 1969 NPC Reports. A contrary view is expressed in Oxman, "The Preparation of Article 1 of the Convention on the Continental Shelf" (a study prepared for the Marine Science Commission).

⁹ Hearings before the Committee on Foreign Relations of the U.S. Senate on Conventions on the Law of the Sea, 86th Cong., 2d Sess., Jan. 1960, p. 108-09.

¹⁰ Judgment of February 20, 1969, I.C.J. Reports, 1969, p. 3, at 53; 8 *International Legal Materials* 340, at 384 (1969).

There are considerable intramural differences within this second group, but the weight of opinion within it views the language of Article 1 as setting a minimum limit of 200 meters and an ultimate limit in terms of adjacency. Between these extremes the actual jurisdiction of the coastal state at any given time is governed by the limit of exploitability at that time—i.e., by the state of the art. This view, its proponents claim, is essentially what was intended by the authors of the Convention. The ultimate limit defined by adjacency, they say, may well be equivalent to the foot of the continental slope, but until exploitability reaches that point the jurisdiction of the coastal state remains *in futuro*.

With regard to the *North Sea Continental Shelf Cases*, this group finds the holding of the International Court to be of limited significance in the present context. The Court was there dealing with the allocation of areas entirely within the 200-meter line and with the inequitable results produced by equidistant lateral boundaries under certain geographical circumstances. It had no reason to consider or pass upon problems relating to the continental terrace or slope.

5. Policy considerations

Distinct from the question of the proper construction of the Convention text is the question of what is a desirable limit for the legal shelf in terms of the broad national interests of the United States. The Commission Report, as noted above, concludes that a shelf claim of the kind advocated in the NPC Report, would not promote these interests. Among the arguments which have been adduced to support this view, in the Report and elsewhere, are the following:

(1) A broad shelf doctrine would benefit other nations proportionately more than the United States, subjecting large areas to national jurisdictions which could then exclude or impede U.S. access to such areas.

(2) Enterprises based in developed countries can compete advantageously in the areas adjacent to their shores, making a broad treaty shelf unnecessary for them. But a broad shelf in the rest of the world could effectively exclude activities by American enterprises or expose them to the same hazard of expropriation as exists on land. Looking at the world as a whole, enterprises interested in exploring and exploiting the resources of a sea bed stand to gain by a narrow shelf provided a satisfactory regime for the deep sea is established without undue delay. Such a limited regime would be preferable to national regimes in many parts of the world.

(3) A wide shelf doctrine would encourage enlarged national claims to the superjacent waters and their resources and to the airspace above. This could be detrimental to U.S. fishing interests. The excessive claims of this kind made by some states after the Truman Proclamation of 1945, and the troubles ensuing therefrom, are cited as a warning of what can be expected.

(4) A wide shelf doctrine would run counter to the U.S. policy to maintain the traditional maximum freedom of the high seas in the interest of the multiple uses, including military uses, which the United States makes of the oceans.

(5) Persons concerned with scientific research favor a narrow shelf, believing that a broad shelf could result in national interference with research expeditions.

(6) To the extent that a policy of import quotas is warranted to protect the domestic oil extraction industry, a narrow shelf is required to prevent nullification of that policy.

Leading points made in reply to these contentions may be summarized as follows:

(1) If the "broad" interpretation of the Shelf Convention is correct, the United States already possesses vested rights to the foot of the continental slope. To surrender these rights to an international regime would be an abandonment of potentially vast resources and revenues which no imaginable *quid pro quo* could justify.

(2) The "disproportionate benefit" argument is beside the point. The important fact is the great amount of resources, in and under the United States' own continental margin, which are brought under direct U.S. control on this "broad" theory. These nearby reserves could be of immense economic and strategic value to this country.

(3) The argument that a broad shelf claim will encourage excessive claims of other kinds by other states is also misdirected. The Convention expressly protects the high seas status of waters above the shelf. Those coastal states which have made or intend to make further claims to the superjacent waters or to exclusive fishery rights are not likely to retract their present claims or refrain from future ones merely because the U.S. opts for a narrow shelf.

(4) Some states (the Soviet Union for one) are so strongly opposed to any supranational deep-sea regime and to the concept of common ownership that any early agreement appears unlikely. That being so, the area of national jurisdiction should be as wide as the 1958 Convention can be construed to permit. Practical working arrangements on this basis should not be difficult to reach with the Soviet Union.

(5) Assuming for the sake of argument that agreement is possible, it would have to be on a compromise basis and of necessity would involve some kind of international administration. Past experience suggests that this could lead to a system of rationing and possible discrimination against American companies. Furthermore, the time lag before any international regime can come into effect means continued uncertainty and consequent discouragement to exploitation.

(6) If small U.S. producers on land need protection against an influx of new off-shore oil, there are better ways to accomplish this particular purpose than by giving up potential U.S. resources.

(7) Scientific research is already being impeded off some coastal states even under a "narrow" shelf doctrine. If it is to be adequately protected and encouraged, the necessary rights and obligations should be dealt with in separate international arrangements made specifically for that purpose.

(8) The seaward edge of the continental margin is a natural dividing line and hence a much more logical choice for a jurisdictional limit than a purely arbitrary line somewhere on the slope.

6. *Methods of defining a more precise shelf limit*

The Commission recommends (p. 145) that the United States should "take the initiative to secure international agreement on a redefinition of the 'continental shelf.'" It is unclear from this language whether the Commission is proposing a formal international convention to this end, or whether the "international agreement" envisaged is to be read as an "international consensus" reached through less formal means.

A substantial sentiment exists among informed persons in this country that under present circumstances a new UN Conference on the 1958 Geneva pattern would not be advantageous for United States interests. Such a conference might well fail to reach agreement, for political reasons unconnected with the legal merits of the various proposals which would come before it. A result of this kind could well convert present uncertainties into complete chaos. Alternatively, an agreement carried by a majority of small states might embody principles unacceptable to the United States, yet which would be difficult to disregard if formally adopted by such a conference. In either event, no real legal gain would result and quite possibly a retrogression would occur which could undo even some of the progress made in 1958.

To avoid these hazards, another way to secure a common understanding as to the limit of the Convention shelf has been suggested in our 1968 Joint Report, in the NPC Report, the Interim Report of the Committee on Deep Sea Mineral Resources of the American Branch of the International Law Association, and elsewhere. This proposes that like-minded maritime states should issue unilateral but concerted declarations announcing their intent to observe a particular limit as the boundary of their shelves under the 1958 convention and to decline recognition of any claims by other states to a greater limit.¹¹ From such a proceeding a pattern of common practice under the Convention could emerge and might well come to receive general acceptance by the world community. In this connection advantage might be taken of the International Court's recognition of the coastal state's sovereign rights over the natural prolongation of its land territory under the sea.¹²

7. *Previous ABA action on a shelf limit*

A number of the considerations noted above as affecting the boundary of the treaty shelf have already been the subject of study, recommendation, and action

¹¹ The 1968 ABA Joint Report stated this point as follows:

"If legal uncertainties are believed to constitute an impediment to utilization of undersea mineral resources, such uncertainties can be eliminated by uniform declarations of the coastal nations which are parties to the Convention on the Continental Shelf, identifying their claims of jurisdiction with the submerged portion of the continental land mass, and reciprocally restricting their claims accordingly. No new conference to amend the Continental Shelf Convention is necessary to accomplish this."

¹² In the *North Sea Continental Shelf Cases*, I.C.J. Reports, 1969, at 31.

within the American Bar Association. In the Resolution adopted by the House of Delegates at its August 1968 meeting, it was noted that "the boundary between the area of exclusive sovereign rights and the deep ocean floor needs to be clarified by an agreed interpretation." The Resolution then recommended that such an interpretation be sought by the United States through the "parallel declarations" method or by other means, and that within the area of exclusive sovereign rights off its coasts the interests of the United States be protected to the full extent permitted by the 1958 Shelf Convention.

In the Joint Report which accompanied this Resolution, the contention that the Convention definition permitted extension of national jurisdiction to mid-ocean, and the contention that it restricted it to the 200-meter line, were both rejected. The better view, the Report said, was that the "exploitability" factor of the Convention was limited by the element of "adjacency." The Report then continued:

"According to this view, therefore, the exclusive sovereign rights of the coastal nations with respect to the seabed minerals now embrace the submerged land mass of the adjacent continent down to its junction with the deep ocean floor, irrespective of depth."

The quoted conclusion, which reflects the "continental margin" interpretation of the Convention, represented and continues to represent an opinion widely held among our members.

Since the 1968 Joint Report, however, a number of our members have stated that this formulation did not accurately reflect their views. In the opinion of these members, the physical concept of "adjacency" can persuasively be construed to embrace areas to the foot of the continental margin; but the "exploitability" concept in the Convention extends sovereign rights over the seabed beyond the 200-meter line only as technological progress makes exploitation in that area possible in fact. Since exploitation techniques still cannot reach the foot of the continental margin, these members believe it erroneous to say that sovereign rights *now* embrace that area. To this extent they are unwilling to perpetuate what they regard as a misunderstanding of their position in the 1968 Joint Report.

Those who take the view that sovereign rights now embrace that area answer that under the existing Convention on the Continental Shelf (1) the coastal State's exclusive sovereign rights encompasses any exploitation on the adjoining continental margin, whether that exploitation is effected by its national or by a foreigner;¹³ (2) a change in the Convention which would retract this boundary of the area of the coastal State's exclusive interest to a line which is landward of the submerged edge of the continent would deprive the coastal nation of rights now recognized in that State by the existing Convention. This being so, they say that it does not matter greatly (with respect to exploration and exploitation of seabed resources) whether the outer limit of exclusive sovereign rights of the coastal State is characterized as the boundary of rights heretofore vested in the coastal nation, or the limit on Jurisdiction to be acquired *in futuro* by exploitation of successively deeper areas, since, in either event, occupation and exploitation by any other State of the area within this limit is prohibited.

8. *Comments and conclusions regarding a shelf limit*

In the light of the discussion above and the previous actions in the ABA which have been described, we submit the following comments and conclusions regarding the points reviewed in this section:

(1) We reaffirm our opinion that the concept of adjacency contained in the present Shelf Convention should properly be interpreted to include the submerged continental land mass. In the view widely held among our members, all of the submerged continental land mass is subject to national jurisdiction over its natural resources. In the view of a significant number of our members any part of this land mass will come within national jurisdiction as soon as it becomes accessible to exploitation.

(2) We reaffirm our opinion that it would not be desirable, in terms of overall United States interests, to seek a formal international conference for the purpose of fixing a precise boundary for the legal shelf. We believe it both preferable and proper to achieve this aim through parallel declarations by interested states announcing a uniform interpretation of the criteria embodied in the 1958 convention.

¹³ Article 2 provides that "If the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities, or make a claim to the continental shelf, without the express consent of the coastal State," and these rights "do not depend on occupation, effective national,"

(3) We reaffirm our opinion that the United States should assert to the full the rights over adjacent submarine areas now vested in it by the shelf convention and by general international law.

(4) We reaffirm our opinion that claims to rights in excess of those recognized in the Shelf Convention (such as rights over the superjacent waters, nonsedentary fisheries, or airspace) are invalid extensions of the continental shelf doctrine, and should be so regarded by the United States.

The position stated in these comments necessarily leads us to disagree with the Commission's recommendation, already quoted, that the United States should take the initiative to secure international agreement on a seaward limit for the legal shelf at the 200-meter line (or 50 miles offshore, whichever is greater). Both these limits have now been exceeded in practice, and they must be regarded as obsolete. We also disagree with the proposed initiative to seek international agreement if this means the convocation of a formal conference for that purpose.

D. The regime beyond the treaty shelf

The Commission Report recommends (p. 147)

"that the United States seize the opportunity for leadership which the present situation demands and propose a new international legal-political framework for exploration and exploitation of the mineral resources underlying the deep seas, that is, the high seas beyond the outer limits of the Continental Shelf as redefined in accordance with the Commission's recommendations."

It then proposes that new international agreements be negotiated to embody six main provisions (each of which is described and discussed below). The Report emphasizes (p. 147) that these proposals are interrelated, and that rejection of any one "would raise serious questions in the minds of the Commission as to the advisability of continuing with the others."

Before proceeding to examine the Commission's specific proposals, we would note that a preliminary question exists as to the urgency for creating an international regime for resources beneath the deep sea. Many of our members feel that it is premature to seek establishment of such a regime at this time. They stress that technology for deep-sea exploitation on a significant scale is not yet available, that not enough is yet known about the character or extent of deep-sea resources, and that an ill-conceived regime can smother development indefinitely.

On the other hand, other members point out that the question of a deep-sea regime is inevitably entangled with the question of the shelf limit. Since it is bound to arise, it should not be disregarded. Further, particularly with respect to hard minerals, the advent of adequate technology to reach deep-sea resources may not be as remote as some think. Finally, the creation of an international framework will require several years of negotiation at least, and the result may be ready none too soon. During the same period great advances may be expected in our knowledge of the oceans, and these can be taken into account as negotiations proceed.

Whichever view is preferable in the abstract, the fact remains that active efforts looking toward an international regime are now under way in the United Nations. The United States must have a policy and position with respect to these efforts. If only for this reason, the proposals for such a regime made by the Commission call for careful scrutiny now.

1. International Registry Authority (p. 147)

The Commission's Report proposes a claim-registration scheme, under which only a state or an association of states would be eligible to register a claim but the registrant may choose anyone to do the work or transfer its claim to another state.

All states should be free to engage, or authorize, preliminary investigation to decide whether to register a claim to explore. An exclusive right to explore or exploit would be acquired by registry with an International Registry Authority. The membership of the Authority and manner of choosing its governing body would be specified in the agreements embodying the new framework. "The Authority should find its place in the family of the United Nations but should be as autonomous as the World Bank" (p. 149).

The Authority should be required to register claims on a "first-come, first-registered" basis, without discretion to deny it except on the ground that the explorer or exploiter is not able and willing to develop the claim.

Upon proof of discovery the Authority would be required to register a claim to exploit for a large enough area and for a long enough time (fixed by the

Authority) to enable economic operation and assure the producer time to recover his investment and an "adequate return thereon." Failure to comply with work requirements would be ground for revocation.

Upon expiration of the registration period, further exploration or exploitation of the subject resources or area should be subject to the regime as it then exists, without any re-registration preference.

To cover the Authority's administrative costs, it should be empowered to fix registration fees.

Comment: Our 1968 Report (pp. 12-13) suggested consideration of a registry scheme as a long-range objective in contrast with proposals for vesting jurisdiction in a supranational agency to grant or deny mineral concessions in the areas beyond national jurisdiction. We consequently approve the Commission's similar conclusion, which avoids vesting of "title" to deep-sea resources in the United Nations (p. 147) and which seeks to create an administrative organ of limited but useful scope. In varying degrees, however, we have misgivings over specific details of the Commission's proposal, including the following:

(1) The structure of the Authority. Its organization must reflect the realities of ocean capabilities, and must be insulated from caprices of the moment in the General Assembly.

(2) The power of the Authority to veto claims and to fix their size and duration. In order to avoid the abuses which can arise from monopoly power, the rights of claimants in all essential respects should be established in the treaty creating the regime.

(3) The denial of any re-registration preference to a state which had developed the area concerned. Such a policy could seriously impair incentive to exploit.

(4) The provision that claims must be registered by a state or states. This presents problems in situations where private enterprise has invested in preliminary exploration and seeks to perfect its rights in an area before claim-jumpers can take advantage of its work. It should be made certain that the principle of "first-come, first-registered" would apply as of the date the applicant gave proper notice to the Authority that it had filed with a member state an application that it register on the applicant's behalf.

(5) The standard of an "adequate return." This is a difficult and unrealistic concept to apply to the extractive industries, where risks are high and many unsuccessful attempts have to be paid for out of the small percentage of successful ventures.

(6) Scientific research. Care must be exercised to prevent the registration system from being used to impede genuine scientific research.

(7) The concept of "paper claims," i.e., speculative registrations. A speculative race to the registry office, a "race to grab," is inevitable if the reward for being first in line, without any prior exploratory effort, is to receive a power to exclude all others from a large area for a period of several years. Experience with mineral laws on land has proven this.

2. *International Fund* (p. 149)

This proposal is intended to compensate the world community as common owner of the resources by using the "economic rent" for purposes that the world community agrees will promote the common welfare. The Commission wisely declares that these purposes must be other than general purposes of the U.N.

The International Registry Authority would fix a rate of payment (not so high as to kill incentive) of a portion of the value of production which it would turn over to the International Fund. The Authority should have no voice in the Fund's management. The membership of the Fund should be determined by the U.N. General Assembly.

Comment: We endorse the principle here recognized, that the agency concerned with production should be separated from the agency distributing the proceeds. It is probably the best way to give practical recognition to the proposition that the resources are the legacy of mankind and to the fact that all states should be entitled to participate in the benefits. However, the question arises whether it is justifiable discrimination to require royalty-type payments from the mineral extractive industries when other users of ocean space (e.g., fishing and merchant marine) are not so burdened.

Our other comments are:

(1) If there are to be royalty-type payments, the Commission is to be commended for the formula "a portion of the value of production" rather than "net return on investment." *Of.* Comment (5) on the Registry, above.

(2) It is questionable whether the Authority should have unrestricted power to fix the rate of payment to the Fund. We believe that this should be settled in the basic agreement creating the regime, or at least that the agreement should set limits to the Authority's discretion. Clearly the Fund should not have power to set the rate.

(3) Determination of the membership of the Fund should be made by the parties to the proposed convention and should not in any event be delegated to the U.N. General Assembly.

3. Powers and duties of registering States (p. 150)

Each state registering a claim must enact domestic legislation to assure compliance with the terms and conditions of the international regime, payments and protection of exploration and exploitation activities. Failure to do this should be a ground of registry revocation by the Authority. The registering state would be free to apply its domestic law not inconsistent with the international regime, e.g., concerning working conditions, marketing of production and taxation.

Comment: We agree in principle.

4. Policing functions of the registry authority (p. 150)

The Report does not recommend that the Authority have any general policing functions. However, since the Authority would have the power to cancel registered claims for cause, it should have the power, according to the Report, to inspect and hold hearings.

Comment: We agree, subject to provisions for review of possible arbitrary action by the Authority, as provided for in the next proposal.

5. Dispute settlement (p. 150)

The Report recommends that the International Registry Authority should initially settle disputes arising under the international regime. However, at the request of any party to a dispute, the Authority's initial decision, including its revocation of claim registration, should be subject to review by an independent arbitral agency.

Comment: We agree. We would note that the possibility of recourse to the International Court of Justice should not be ruled out.

6. Intermediate Zone (p. 151)

In the Commission's view, mineral resources of the deep sea do not in fairness or law belong to the coastal states to the exclusion of other states from their benefits.

However, the Commission recognizes that some coastal states may regard themselves as having preferential rights to resources of a reasonable subsea area beyond the treaty shelf and also have a national security interest in adjacent offshore areas. For these reasons, some coastal states might be reluctant to agree to a narrow treaty shelf without recognition of their particular interests in the area immediately beyond.

As a compromise of the foregoing opposing views, the Report recommends the creation of an intermediate zone of seabed, seaward of the treaty shelf as defined by the Commission, to the 2,500 meter isobath or 100 nautical miles from the baseline of the territorial sea, whichever gives the greater area. The boundary would be permanently fixed as in the case of the shelf. The Commission assumes that the 2,500 meter isobath is the average depth at the foot of the geological continental terrace or slope and 100 miles is the average width of the shelf and slope or terrace. (Geologists do not all agree that these assumptions are true or relevant).

Only the coastal state or its licensees would be authorized to explore and exploit resources therein. It need not do so, but if it does so, its claims must be registered with the Authority and would come under the other terms and conditions of the international regime.

Comment: This proposal is essentially an effort by the Commission to propitiate the proponents of a "broad" treaty shelf. Many of the arguments summarized earlier with regard to the proper limit of the shelf are also applicable, pro and con, to this intermediate zone concept. If the Commission's "intermediate zone" proposal were adopted, in conjunction with a "narrow" shelf, foreign coastal nations would have exactly the same power to exclude American companies, or to demand burdensome concession terms, as they would have if their jurisdiction were commensurate with a "broad" shelf extending to the 2,500 meter isobath or other outer limit of the proposed intermediate zone. Such a zone

has, however, other drawbacks, of which the most weighty is perhaps its sheer awkwardness. Areas subject to divided responsibility are rarely viable, as the history of condominium and internationalized zones in international law indicates.

On balance, we are opposed to this proposal.

An alternative proposal which has been put forward would call for complete coastal state authority over the zone but would provide for some kind of payments to the International Fund. Such an arrangement would be less objectionable, but it might lessen the incentives to the coastal state and its licensees to push on with development. It is also possible to foresee administrative difficulties under this system as well.

7. Conclusion with respect to areas beyond national jurisdiction.

Under the 1968 Resolution of the House of Delegates, the American Bar Association is committed to support the development as soon as practicable of international arrangements to govern the exploitation of deep-sea resources beyond the limits of national jurisdiction. Such arrangements, the Resolution affirms, must assure, *inter alia*,

"Freedom of exploration by all nations on a nondiscriminatory basis; security of tenure to those engaged in producing the resources in compliance with such rules, encouragement to discover and develop these resources, and optimum use to the benefit of all peoples"

Except for the intermediate zone proposal, and subject to the various *caveats* expressed in the foregoing comments, we believe that the Commission's recommendations for a deep-sea regime are broadly in harmony with the principles of the Resolution.

We would reiterate our belief, however, that the details of the Commission's proposed registry plan need careful attention before being submitted as a basis for international discussions. There are, in our opinion, too many loose ends and loopholes which might permit abuse in connection with the requirements for the registration, maintenance and vacating of claims. We are all against a "race to grab." It is difficult at present for anyone to "grab" the deep seabed physically but the concept of registration of paper claims would for the first time create the mechanism to make such a "grab" possible. Obviously safeguards against such a possibility must be drawn with the utmost care, but the factual data necessary for meaningful draftsmanship are not yet available.

Many of our members strongly believe that the first step, in setting up a deep seas regime, should not be the establishment of a system which recognizes paper claims or purely speculative registrations, but should be, instead, agreement on norms of conduct to be observed by the nations capable of carrying out deep-sea mineral exploration.¹⁴ Such norms would be designed to minimize interference between expeditions or operators, and to preclude "jumping" of areas which are under actual exploration or development, plus reasonable protective margins. This, they believe, may well evolve into a more formal system of registry of claims, but only after enough information has been acquired to make possible an agreement on criteria with respect to areas, duration, diligence requirements, and other factors historically associated with mining rights. Such consensus on norms of conduct should be without prejudice to any agreement to dedicate some portion of the value of production from deep-sea mineral resources to agreed international purposes.

E. Relations between Government and private enterprise, and the international registration system (p. 153)

The Commission points out that the relations of the United States, as a registering nation under the international regime, with the business entities on whose behalf it will register claims are a matter of purely domestic concern. The recommendations which it makes for U.S. domestic procedures to deal with these relations are summarized below.

1. Policies applicable to all registered claims

The Report recommends that the Department of the Interior be the U.S. agency which would register U.S. claims with the International Authority. Companies would apply to the Department of the Interior, paying to it the fees specified by the international regime to be forwarded to the Authority. The companies' royalty-type payments for exploitation should take the place of both the annual

¹⁴ This concept was referred to in our 1968 Joint Report.

rent and the royalty now paid for mineral leases on the Outer Continental Shelf.

We agree in general, but would recall our comment in regard to the Authority about the danger of delay in domestic registration channels which could lose an applicant his "first-come" position before the Authority.

2. *Additional Intermediate Zone policies*

The Report recommends (p. 154) that the Secretary of the Interior should have power to award mineral rights without requiring competitive bidding, on the same basis as it recommended such procedure for the Outer Continental Shelf.

This problem only arises if the intermediate zone proposal is adopted.

3. *Additional policies beyond the intermediate zone*

If the United States uses competitive bidding to select the companies to explore and exploit claims registered by it with the International Authority, U.S. companies would have an incentive to request states which charge less to register claims on their behalf. This would create a "flag of convenience" problem unless the United States prevented its nationals from applying to other states. The latter would be undesirable. Therefore, the Report recommends (p. 155) that the United States follow the "first-come, first-registered" policy in selecting the companies on whose behalf it registers claims with the Authority.

We agree with this recommendation.

F. A Course of Interim Action

The Report observes (p. 155) that it will take years to arrive at a new framework. In the meantime, it is important to seek early agreement on principles to guide states in interim exploration and exploitation of deep-sea resources. The Commission therefore announces its support for the principles proposed by the United States in the United Nations in June 1968,¹⁵ which it summarizes as follows:

- (1) A "redefinition of the outer limits of the continental shelf."¹⁶
- (2) Exclusion of any claims to national sovereignty or sovereign rights over the deep-sea floor beyond the shelf limit.
- (3) Dedication to international purposes of a portion of the value of the resources recovered.
- (4) Call for a new international regime to be established as soon as practicable.
- (5) Exploitation prior to the establishment of a shelf limit to be without prejudice to the eventual location of that limit.

To implement this last principle, the Commission recommends a U.S. proposal that in the interim, no nation should claim sovereign rights beyond the 200-meter line. Exploration and exploitation should, however, be permitted to continue beyond that line, provided that the authorization therefore "explicitly states that such exploration or exploitation shall be subject to the new international framework agreed upon" (p. 156).

Recognizing the uncertainties which such a rule would create for the private entrepreneur who would not know when his landlord and the terms of his lease might be switched, the Commission recommends (p. 156):

"That Congress enact legislation to compensate private enterprise for loss of investment or expenses occasioned by any new international framework that redefines the continental shelf so as to put the area in which it is engaged in mineral resources development beyond the shelf's outer limits."

A final recommendation from the Commission (p. 156) is that the Outer Continental Shelf Lands Act be amended to require permission from the Secretary of the Interior:

"To engage in mineral resource exploration or exploitation in any subsea area beyond the 200-meter isobath upon such terms and conditions as the Secretary deems appropriate. The amendment should make clear that this requirement is not intended to constitute a U.S. claim to exercise sovereignty or sovereign rights over any subsea area beyond the 200-meter isobath."

In exercising this authority, the Secretary of the Interior should be guided by the Secretary of State's judgment as to foreign policy implications (p. 157). It is

¹⁵ UN Doc. A/AC. 135/25; also in 59 Dept. of State Bulletin 152 (August 5, 1968).

¹⁶ We do not read the U.S. proposal this way. It did not, in our view, propose a "redefinition" of the outer limits of the continental shelf, but merely proposed that the limit be fixed in accordance with the existing Convention on the Continental Shelf.

our understanding that the scope of this proposal would not be confined to areas off the U.S. coast; it would apply to activities by U.S. nationals off any coast, in order to assure Government control of the evolving worldwide situation pending adoption of the new international framework.

On these interim measures proposed by the Commission, we agree in part and disagree in part.

Of the five principles put forward in the United Nations, we find the first four acceptable (on the understanding, with respect to the first, that redefinition of the shelf limit be taken as equivalent to arriving at an agreed interpretation of the Convention definition rather than a new convention). These principles are also in harmony with the 1968 ABA Resolution.

We disagree with the fifth principle and with the recommendations for implementing it (except insofar as these recognize the importance of not suspending deep-sea exploration and exploitation activity).¹⁷ These proposals, calling in effect for a moratorium on claims beyond the 200-meter line, are in our opinion retrogressive, impractical, and not in the best interests of the United States. The principal reasons for our conclusions may be summed up as follows:

(1) The 200-meter line is out of date. Activities now exist beyond that line, undertaken in justified reliance on the exploitability concept of the Shelf Convention. These are now clearly within the national jurisdiction, and their status should not now be cast in jeopardy.

(2) Under our view of the Shelf Convention and its interpretation by parallel declarations, there is no need for a moratorium on claims. National rights simply extend or will extend to the limit of adjacency and stop.

(3) The possibility of shifting regimes and responsibilities will assuredly discourage the large investment needed to develop resources in deeper and deeper waters. The adverse effect on U.S. interests is obvious.

(4) The proposal for compensation is unrealistic. Even if Congress were prepared to enact such legislation, the suggested measure of compensation is wholly inadequate for the risks involved. The device thus fails to supply the inducement needed to overcome the uncertainties noted in point 3.

APPENDIX

Recommendation

The Sections of Natural Resources Law, International and Comparative Law, and the Standing Committee on Peace and Law Through United Nations, recommend that the following resolution be adopted by the House of Delegates:

Whereas, the natural resources of the seabed and subsoil under the high seas are becoming, through technological progress, increasingly available to mankind in ways until recently unforeseen; and

Whereas, a Committee of the United Nations General Assembly is presently considering "practical means to promote international co-operation in the exploration, conservation and use of the seabed and the ocean floor, and the subsoil thereof, . . . and of their resources"; and

Whereas, the United States, as a member of that United Nations Committee, has proposed that the exploration and use of the deep ocean floor be open to all states and their nationals without discrimination and in accordance with international law, and as a corollary of this that the exercise of sovereign rights over any part of the deep ocean floor be ruled out; and

Whereas, the treaty known as the 1958 Convention on the Continental Shelf in force between 37 nations, including the United States, recognizes that each coastal state has "exclusive sovereign rights for the purpose of" exploring and exploiting the natural resources of "the sea-bed and subsoil of the submarine areas adjacent to the coast . . . to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas"; and

Whereas, it is generally recognized that the definition in the 1958 Convention on the Continental Shelf of the boundary between the area of exclusive sovereign rights and the deep ocean floor needs to be clarified by an agreed interpretation; and

Whereas, the House of Delegates, by its Resolution of August 9, 1966, stated that "prior to framing a policy . . . the United States Government . . . review

¹⁷ The Standing Committee on World Order Under Law takes no position with respect to the fifth principle here discussed, for want of sufficient qualification to do so.

thoroughly the issues at stake in consultation with representatives of the American Bar Association and others competent in the field of international law, with scientific and technical experts and with leaders of American industry in oceanic development";

Now, therefore, be it resolved, that the American Bar Association

Supports the efforts being made in and out of the governments of interested states to protect the seabed and subsoil of the deep ocean floor beyond the limits of national jurisdiction from claims of sovereignty or rights of discretionary control by any nation or group or organization of nations;

Supports the call by the United States Government for internationally agreed arrangements governing the exploitation of natural resources of the deep ocean floor beyond the limits of national jurisdiction to be established as soon as practicable;

Recommends

(1) That the United States consult with other parties to the 1958 Continental Shelf Convention with a view to establishing, through the issuance of parallel declarations or by other means, an agreed interpretation of the definition of the boundary between the areas of exclusive sovereign rights with respect to natural resources of the seabed and subsoil and the deep ocean floor beyond the limits of national jurisdiction.

(2) That within the area of exclusive sovereign rights adjacent to the United States, the interests of the United States in the natural resources of the submarine areas be protected to the full extent permitted by the 1958 Convention on the Continental Shelf.

(3) That on the basis of the information now available, the most desirable long-range goal for a regime to govern exploration and development of the mineral resources of the seabed and ocean floor and subsoil beyond the limits of national jurisdiction is not the creation of a supersovereignty with power to grant or deny mineral concessions, but rather agreement upon norms of conduct designed to minimize conflicts between sovereigns which undertake such exploration and development.

(4) That the resources of the bed and subsoil of the deep sea, beyond the limits of national jurisdiction, be the subject of study and consultation with a view to formulating rules and practices to be observed by common restraint or by other arrangements which will assure, *inter alia*, freedom of exploration by all nations on a nondiscriminatory basis, security of tenure to those engaged in producing the resources in compliance with such rules, encouragement to discover and develop these resources, and optimum use to the benefit of all peoples; and

Authorizes representatives of the Sections of Natural Resources Law and International and Comparative Law and the Standing Committee on Peace and Law Through United Nations to express the foregoing as the views of the American Bar Association to agencies of the Government of the United States and to the Congress of the United States.

Committee on
Deep Sea Mineral Resources
OF
THE AMERICAN BRANCH OF
THE INTERNATIONAL LAW ASSOCIATION
Interim Report

JULY 19, 1968

MEMBERSHIP OF
THE COMMITTEE ON DEEP SEA
MINERAL RESOURCES
OF
THE AMERICAN BRANCH OF THE
INTERNATIONAL LAW ASSOCIATION

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(Mr. Henkin dissents to this report. See p. XXI. Mr. Finlay, for opposite reasons, dissents in part. See p. XII. Messrs. Schachter and Futterman, because of their official positions, ask that their names not be included as sponsors.)

I. INTRODUCTION

1. *Subject Matter of this Report*

Heightened interest in and concern over the availability of new sources of ocean minerals, both fuel and non-fuel, are common around the globe. It is clear that a serious, and probably prolonged, process of international debate and decision is now in its initial stages and that states are moving to clarify their common interests in ocean resources development. The purpose of this Report of the American Branch Committee on Deep Sea Mineral Resources is to discuss considerations relating to the exploration for, and the exploitation of, mineral resources beneath the world oceans, and to make recommendations concerning the legal framework for such exploration and exploitation.

2. *I.L.A. Action at Helsinki (1966)*

The International Law Association is indebted to the foresight of the Executive of the Netherlands Branch in taking the initiative of establishing a committee to study the legal regime of deep sea mining, whose report at the Helsinki Conference brought to the attention of all the looming importance of this subject. Thereafter, the Executive Council on 12 November 1966 set up a working group on "Deep Sea Mining," with the late Rear Admiral M. W. Mouton (Netherlands) as Chairman, for the study of this subject.* The American Branch Committee presents this Report in furtherance of that inquiry.

3. *Current Activities*

(1) *United Nations*

On the international level marine science affairs engage the attention of at least 100 different public and private organizations, but most public attention is devoted currently to the events taking place in the United Nations itself, including especially the General Assembly and the Economic and Social Council. The latter in 1966 adopted Resolution 1112 (XL) which requested the Secretary-General:

(a) to make a survey of the present state of knowledge of these resources of the sea, beyond the continental shelf and of the techniques for exploiting these resources . . . ;

(b) as a part of that survey, to attempt to identify those resources now considered to be capable of economic exploitation, especially for the benefit of developing countries;

* Admiral Mouton was succeeded by Prof. D. H. N. Johnson, of Great Britain.

(c) to identify any gaps in available knowledge which merit early attention by virtue of their importance to the development of ocean resources, and of the practicality of their early exploitation.

(Pursuant to this request the Secretary-General in early 1968 released two reports dealing with mineral resources and living resources other than fish.) In 1966 the General Assembly also adopted Resolution 2172 (XXI) endorsing the ECOSOC Resolution, requesting a comprehensive survey of activities in marine science and technology around the globe, and further requesting the Secretary-General in cooperation with UNESCO and FAO to formulate proposals for:

(a) Ensuring the most effective arrangements for an expanded programme of international cooperation to assist in a better understanding of the marine environment through science and in the exploitation and development of marine resources, with due regard to the conservation of fish stocks;

(b) Initiating and strengthening marine education and training programmes, bearing in mind the close interrelationship between marine and other sciences; . . .

In implementing this request the Secretary-General appointed a Committee of Experts and his report and proposals are at this writing expected to be released momentarily.

Most recently, in December of 1967, the General Assembly adopted Resolution 2340 (XXII) entitled "Examination of the question of the reservation exclusively for peaceful purposes of the sea-bed and ocean floor, and the sub-soil thereof underlying the high seas beyond the limits of the present national jurisdiction and the uses of their resources in the interest of mankind." The Resolution established an Ad Hoc Committee on the Oceans which was to prepare for the 23rd General Assembly a study which would include:

(a) A survey of the past and present activities of the United Nations, the specialized agencies, the International Atomic Energy Agency and other inter-governmental bodies with regard to the sea-bed and the ocean floor, and of existing international agreements concerning these areas;

(b) An account of the scientific, technical, economic, legal and other aspects of this item;

(c) An indication regarding practical means to promote international co-operation in the exploration, conservation and use of the sea-bed and the ocean floor, and the sub-soil thereof, as contemplated in the title of the item, and of their resources, having regard to the views expressed and the suggestions put forward by Member States during the consideration of this item at the twenty-second session of the General Assembly;

This Ad Hoc Committee, on which 35 nations are represented, has constituted two working groups. One deals with technical and economic matters, one with legal matters. The plenary Committee and the two working groups have held a number of meetings, but, as of this writing, their reports are not yet available.

(2) *U. S. Government*

The Congress of the United States has devoted several years of increasingly closer study to the requirements of a national effort to harness the resources of the sea to the benefit of the United States and mankind. The culmination of this Congressional activity came with the adoption of the Marine Resources and Engineering Development Act of 1966.

The major significance of the Act lies in the creation of a cabinet-level body, called the National Council on Marine Resources and Engineering Development, charged with the responsibility, *inter alia*, of developing a comprehensive program of marine science activities. Of equal, if not more, importance the Act called for the establishment by Presidential appointment of a Commission on Marine Science, Engineering and Resources which was to "make a comprehensive investigation and study of all aspects of marine science in order to recommend an overall plan for an adequate national oceanographic program that will meet the present and future national needs." The Commission is composed primarily of private citizens; only five of the fifteen members may be from the Federal Government.

In addition to stimulating intensive activities within the many federal agencies involved in marine science affairs, an important effect of the creation of these two bodies has been both to provide a much sharper focus upon marine science affairs in the United States and to establish a means by which new ideas can be generated and important initiatives identified and set in motion. Thus far in its two annual reports the Council has devoted predominant attention to this latter task, in each instance selecting programs deserving priority and designating the lead

federal agency for implementation. The Report of the Commission is formally due in January 1969, and is expected to be available late in 1968.

Among the most important results thus far of the Council's work is the concept of the International Decade of Ocean Exploration (IDOE) which was initially proposed by President Johnson in March 1968. A White Paper on the Decade issued by the Council in May offers the following elaboration:

The Decade is envisioned as a period of intensified collaborative planning, development of national capabilities, and execution of national and international programs of oceanic research and resource exploration. Knowledge of the ocean and its resources is exceedingly limited. Because of the very size, complexity and variability of the marine environment, scientific investigations of vast scope will be necessary if knowledge of this environment is to increase within a reasonably short interval. At the same time excellence, experience, and capabilities in marine science and technology are shared by many nations. Hence, a broad program of ocean exploration can be carried out only through a cooperative effort by many nations. The success of such an endeavor will depend in large measure on the extent to which various nations contribute their particular expertise and capabilities, assume a share of responsibility for the program, develop their manpower and facilities, and disseminate to others the results of scientific discoveries.

(3) *Bar Association and other groups*

Paralleling this greatly intensified governmental activity are numerous private groups whose activities include technical, economic and legal consideration of marine resources. Among these are the Committee on Oceanography of the Section of International and Comparative Law of the American Bar Association, the Committee on Marine Resources of the Section of Natural Resources Law, and the Standing Committee on Peace and Law through United Nations, of that Association, and the National Petroleum Council's Committee on Petroleum Resources under the Ocean Floor. Each of these has published, or circulated, drafts of important reports.

(4) *Questions Discussed*

These various events on the international level, and within the United States and in governmental and private bodies within other countries,

set the framework for this present Report of the American Branch Committee. These activities emphasize that there are great deficiencies and gaps in basic knowledge of the marine environment and its resources which must be remedied if wise decisions are to be made. In all international and national considerations and expressions thus far made, overwhelming emphasis is placed upon the need for intensified scientific and technical research and legal analysis.

In light of these considerations the Committee's Report and recommendations deal both with the procedural question of when to attempt revision of the law of the sea and with the two substantive questions now most frequently discussed: (i) the limit of the exclusive jurisdiction of the coastal states with respect to the exploration and exploitation of the natural resources of the sea-bed and sub-soil of submarine areas adjacent to their coasts, pursuant to the principles recognized in the 1958 Convention on the Continental Shelf, and (ii) the choice of regimes best adapted to the development of the natural resources of the deep ocean floor seaward of the areas encompassed by the jurisdiction of the coastal states.

This report does not discuss military and security questions because we assume that the deep sea floor, by common accord, will be regarded as not subject to acquisition of territorial sovereignty, and will be reserved for peaceful purposes.

II. NEED FOR FURTHER STUDIES AND EXPERIENCE BEFORE CONVENING AN INTERNATIONAL CONFERENCE TO REVISE LAW OF THE SEA RELATING TO MINERAL DEVELOPMENT

After careful review of developments in ocean use, the Committee believes that it is not in the common interest immediately to seek international agreement, by means of an international conference, on the issues of the limit of the continental shelf and of a regime for the deep ocean regions beyond the limit on the rights of coastal states. Rather, the present need is for the careful studies and inquiries required in preparation for negotiation of such agreements as may eventually be required as we gain knowledge of, and experience in, the marine environment. A number of major considerations indicate that to attempt legal regulation for mineral exploitation through a large multilateral conference would probably hamper rather than promote wise use of ocean resources.

These considerations include:

1. There is widespread misunderstanding or lack of knowledge of the extent and distribution of ocean resources and of the conditions required for their productive use;
2. There is resultant inability to identify anticipated legal and political problems with useful precision;
3. Many, if not all, states are unable presently to determine their national interests in the development of ocean mineral resources and associated issues;
4. Provision of an adequate jurisdictional and regulatory framework for management of ocean mineral resources is dependent upon a major international effort at research and exploration in the oceans;
5. Satisfactory accomplishment of a comprehensive program in scientific research and exploration requires an intensive effort on the part of many states over a period of many years.

In sum, these factors strongly urge that states refrain from any immediate action toward convening a new law of the sea conference or toward revision of the Geneva Conventions. It is, however, conceivable that the required majority of states does not or will not similarly weigh these factors and that an international conference on the law of the sea will again be convened in the near future. The Ad Hoc Committee of the United Nations may or may not recommend such a course. It is also quite conceivable that means other than formal treaty revision may appear desirable for clarifying certain problems, particularly concerning the continental shelf.

In either event, it is incumbent upon those concerned with the protection of the common interests of the states to offer their views on the legal areas which will best provide for those common interests.

Accordingly, the remainder of this Report is devoted to the system of law which, in our view, does or should govern the exploration, development, and production of the mineral resources underlying the high seas (for this discussion, the term "high seas" refers to the oceans beyond the territorial sea).

The choice of a legal regime involves two groups of problems:

1. What geographical restrictions, if any, ought to be imposed on the exclusive jurisdiction which the Continental Shelf Convention rec-

ognizes in the coastal nation with respect to the mineral resources in and beneath the adjacent bed of the sea?

2. Seaward of the exclusive jurisdiction of the coastal state, determined by the Convention on the Continental Shelf, is it necessary at this time to establish any formal regime to govern mineral exploration and production? If so, what should be the objectives and structure of such a regime?

III. CRITERIA FOR OPTIMUM MINERAL DEVELOPMENT

1. *Objectives of mineral legislation*

Our principal concern in this Report is to identify the requirements for bringing into productive use the minerals located beneath the oceans. The mineral deposit which remains undiscovered, or, being discovered, remains undeveloped, is as useless to man as though it did not exist.

The world-wide experience of nations has demonstrated that a successful system of mineral development laws, whether operating on land or under the sea, should have these objectives:

(1) To encourage the discovery and putting to work of the world's minerals at the lowest cost to consumers consistent with a fair return to the investor and with the maximum ultimate recovery of those minerals, having in mind the needs of future generations as well as our own.

(2) To bring about maximum ultimate recovery by encouraging conservation—in the sense of wise use—both of the minerals themselves and of the natural forces, such as reservoir energy, which are required for their production; conversely, to deter the physical waste of the world's mineral estate.

(3) To facilitate access to minerals, on a non-discriminatory basis, by all responsible interests.

(4) To reconcile competing uses of the environment and minimize the adverse effect of mineral operations on that environment.

2. *The essentials which a mineral regime must offer to bring about development*

To accomplish the objectives that we have identified, it is not enough to articulate them in statutes or conventions.

Men must be induced to risk life and treasure to find and win minerals. The business of discovering and producing them is hazardous enough on land. Under sea, it is much more costly and risky, both financially and physically. Capital must be attracted to the deep sea mineral business in competition with other demands upon it, and in competition with safer mineral investments on shore and in shallower waters.

Successful mineral laws offer three general types of inducement to attract capital and talent:

(1) The mineral regime must offer encouragement to look for minerals, that is, to undertake reconnaissance or prospecting in the hope of finding areas promising enough to justify later expenditures on concentrated exploration.

(2) Security of tenure is essential. The enterprise which drills wells or sinks shafts in search of minerals is gambling large sums, with the odds heavily against the finding of a mineral deposit of value justifying the amount of money invested. It requires the exclusive right to occupy a stated area for exploration and the exclusive right to produce minerals discovered in that area, and to do so for an assured period of time—both the area and the time being commensurate with the character of the risk taken and the amount hazarded.

(3) The mineral venture must have a reasonable prospect that, in the event of success, the exactions of the granting authority, in royalties and taxation, will not be so oppressive as to stifle the undertaking or discourage its continuance.

3. The application of the foregoing principles to undersea mineral development

It does not appear to require argument that if the foregoing principles for the protection of the public interest and the recognition of the miner's necessities are essential to a successful mineral regime on land, they must be essential elements of a successful regime undersea, where risks are immensely greater. At sea, the geology is hidden, no outcrops are visible; the expenses in all phases of exploration are much larger; if minerals are discovered, the costs of development, production, lifting, and transportation are enormously increased. The undersea mineral venture is even more capital-intensive than a comparable venture on land, and, if a mineral deposit is found, it must therefore have greater producibility or higher unit value than need be shown by the economically producible onshore deposit.

The problem to be considered here, therefore, can be restated as follows: What kind of undersea mineral regime will best encourage prospecting, guarantee security of tenure, and fairly balance governmental financial exactions with the risks of the enterprise, while bringing about the maximum ultimate recovery of minerals at the lowest ultimate cost to the consumer, and with an acceptable level of dislocation of other uses of the marine environment?

The problem, as indicated earlier, divides itself into two phases: one related to the jurisdiction of the coastal state, the other to the regime (whatever it may be) seaward of the coastal state's area of competence.

IV. THE AREA OF COASTAL STATE EXCLUSIVE JURISDICTION

The jurisdiction of coastal states with respect to the natural resources of the sea-bed and sub-soil areas under the high seas is determined by the Geneva Convention on the Continental Shelf. By that instrument the community of nations has decided that the interests of mankind are best served by reserving to coastal states exclusive sovereign rights in the natural resources of the sea-bed and sub-soil of the submarine areas adjacent to their coasts, not only to the 200 meter depth, but beyond that depth "to where the depth of the superjacent water admits of the exploitation of the natural resources." The basis for this recognition of exclusive mineral jurisdiction is twofold: the predominant interest of the coastal state in the bed of the sea adjacent to its shores, and the necessity for certainty as to what law is applicable to that sea-bed. To date, some three-score nations have given recognition to the principles of that Convention, 36 by ratifying it, the others by adopting major provisions of it in domestic legislation or regional agreements. From the wide acceptance of the principles set forth in the Convention, even by states which are not parties, it is clear that they constitute part of customary international law.

However, for reasons seldom made explicit, some find difficulty with the boundary definition in the Convention, particularly in terms of the reach of the exploitability criterion in light of the principle of adjacency. Accordingly, a number of alternatives are now being advanced in various quarters for revising the Continental Shelf Convention in order to place a firm limitation on coastal control. The Committee believes that this assumption of a need to revise the Shelf Convention is unwarranted

in terms of projected technological progress in offshore mineral exploitation. Reasonably interpreted, the Convention definition of the shelf extends, and limits, coastal control to adjacent marine regions of sufficient extent that the outer limit of control will not be reached for a very long time.

As a general rule, the limit of adjacency may reasonably be regarded as coinciding with the foot of the submerged portion of the continental land mass. There is strong support for this view in the drafting history of the Convention,* although other interpretations have been advanced. From the geological standpoint, this interface at the submerged continental margin is a profound natural boundary. Characterized by a marked change of structure between the continental mass and the crust of the deep ocean basins, it is generally to be found at a depth of from 2,000 to 3,000 meters. As stated recently by the United States representative in the Technical and Economic Working Group of the United Nations Ad Hoc Committee:

“The composition of the continents, including their submerged parts, is basically different from that of the oceanic crust of the deep ocean basins. The boundary between the two is one of the most profound natural interfaces. It is gradational in many places and not easily established by direct observation, but generally occurs near the base of the continental slopes at a depth of about 2500 meters.

* * * * *

“ . . . The gradational interface between the submerged parts of the continents and the ocean basins naturally fixes the seaward limit of any continental feature, and is from the scientific point of view the conceptual boundary between continental and oceanic seabed resources. It is important to recognize, however, that neither this nor any other geologic or topographic boundary is sufficiently distinct and consistent to serve by itself as the means of defining a precise juridical boundary.”

In view of the fact that this feature is thus often difficult to locate from direct observation, it would seem reasonable and convenient to equate it generally, for the time being at least, with the 2,500 meter isobath. This would be in approximate accord with the geological realities.

* See Appendix to this Report.

We are advised informally by scientists of the U. S. Geological Survey that about 7.5 percent of the area of the ocean floor is encompassed by the 200 meter isobath. Similarly, about 16 percent of the area of the ocean floor is included within the 2,000 meter contour. While no comparable estimates are available for the 2,500 meter isobath, adjacent to the continents, an estimate has been made for the 3,000 meter isobath (world-wide, not merely adjacent to the continents), and the percentage of the area of the world's ocean basins found to be included by that isobath is about 25 percent. It would appear, therefore, that if coastal state mineral jurisdiction is equated geographically with the submerged continental land mass (the continental margin, including the geological concepts of the continental shelf, the continental slope, and the landward portion of the continental rise), and if this, in turn, is equated provisionally with an average water depth of 2,500 meters, adjacent to the continents, the result is that substantially less than 20 percent of the area of the world's sea-beds is within the exclusive mineral jurisdiction of the coastal states, and more than 80 percent of the total sea-bed area is outside the coastal regime with respect to mineral development.

In particular instances, as where there is a very narrow or ill-defined continental margin, it may be equitable to regard the limit of adjacency as extending beyond this line. In such situations, the adjacency concept gives the coastal state exclusive mineral jurisdiction in an area of deep ocean floor which is reasonable with regard to all relevant circumstances. In general, a reasonable measure of this jurisdiction might well be the average width of the continental margins of the world's oceans, or approximately 100 miles, though there might be situations, as in the case of some of the smaller seas, in which a different standard would be more appropriate.

Special problems may also occur with respect to islands.

On the view proposed above, a sufficiently definite seaward limit for the exclusive jurisdiction of the coastal state may be persuasively derived from the language of the Convention as it now stands. Any doubts or differences can be resolved on an *ad hoc* basis as they arise. Hence there would seem to be at this time no need to consider possible changes in the Convention in anticipation of the time when it becomes open to proposals for revision in June 1969. Likewise, it does not now seem desirable to urge the convening of a new international conference, which might well raise more problems than it would settle.

Nevertheless, in view of current debate over the limit of coastal state jurisdiction under the present Convention, it may be desirable that this

limit be explicitly clarified. Rather than attempt such clarification through an international conference, it would appear preferable to deal with the matter by means of parallel *ex parte* declarations in which the states concerned would voluntarily recognize limits on their exclusive jurisdiction along the lines suggested in this Report. Such declarations might well contain not only an express recognition of the proposed definition of adjacency, but also an affirmation of intent not to recognize more extensive claims by others—e.g., to the middle of the great oceans. By such means it would be possible to build up a pattern of concordant state practices by which the meaning of the existing Convention language may be authoritatively determined.

In connection with the *ex parte* declarations above mentioned, states may also wish to give serious consideration to provision, in accordance with internal law and constitutional procedures, for allocation of a portion of the revenues derived from part of the area of coastal control to an international fund earmarked for expenditure for generally approved international purposes. Different conclusions might be reached by different states depending upon current levels of foreign aid expenditures and policies relating to dedication of revenues derived from specific sources for specific purposes. In the United States, such policy decisions must be made by the Congress.*

V. THE DEEP OCEAN FLOOR BEYOND THE AREA OF COASTAL CONTROL

1. *The need for a sound beginning*

We turn now to consider the deeper ocean areas, those seaward of the coastal regime established by the Convention on the Continental Shelf. Inasmuch as the coastal regime controls mineral development on the continents, including the submerged continental land mass, and this, generally speaking, extends to depths of the order of 2,500 meters, it seems valid to expect that the opportunities in the areas under coastal control (contrasted with the formidable technical and economic problems attending mineral development beneath deeper water) will occupy the creative and productive energies of scientists and engineers for several decades to come. Mineral developments will move out to very deep

* Mr. Finlay dissents with respect to this paragraph, saying: "I see no more reason for a nation's allocating a portion of the revenues derived from offshore operations than for allocating a portion of the revenues from onshore operations to international purposes and the very making of the suggestion casts an implied cloud on the title of the coastal states to the mineral resources of their continental margins."

waters only when net costs of exploration and production there will compete favorably with like costs for obtaining those minerals on land or beneath shallower waters, or with the costs of obtaining acceptable substitutes.

The hard minerals most frequently mentioned as deep sea resources are those found in so-called manganese nodules (i.e., manganese, copper, nickel, cobalt). The known onshore deposits of manganese superior to the average grade found in the nodules exceeds 100 years of supply of the world's consumption at present rates. The known onshore deposits of the other components of the nodules is less, in terms of years of consumption, but is still measured in four to ten decades, and these metals are not immune to competition from substitutes—aluminum for copper, for example. This is without reference to the formidable technical problems involved in mining beneath water depths nearly twice as great as that which crushed the submarine "Thresher"; delivering the ore in very large daily tonnages; receiving it on board a floating smelter or beneficiating plant which must operate in the open stormy sea in fixed positions (or lose contact with the submarine hoisting device); and processing it by metallurgical techniques not yet available, but which must be devised if these metals are to be separated from the highly refractory material containing them.

With respect to oil and gas, the geologists believe that the major opportunities lie in the sediments of the continental margin—the areas which are now subject to coastal jurisdiction—and not in the floor of the deep oceans, which is of quite different geologic origin. Aside from this, it is valid to expect that development of petroleum resources beneath the oceans will first take place in the shallower areas, for economic reasons. Experience to date has shown that the outlay for moving out into deeper water has risen almost in geometric proportion, as related to depth. Competition of non-conventional onshore substitutes, such as tar sands, oil shale, and hydrogenation of coal, as well as other energy sources, such as nuclear fission (and, potentially, nuclear fusion) will impose limitations on incentives for petroleum production from the deep ocean floor. For example, it has been estimated by Chairman Seaborg of the United States Atomic Energy Commission that:

" . . . fusion of the atoms of heavy hydrogen available in the oceans of the world will open up an energy resource equivalent to 500 Pacific oceans filled with high grade petroleum."*

* Dr. Glen T. Seaborg, "The Proliferation of the Peaceful Atom," before the American Public Power Association, May 11, 1967.

This is not to say that the development of the minerals of the deep ocean floor beyond the continental margins will not occur. But the assertion,* frequently repeated, that some six billion dollars of gross annual income from undersea mineral development could accrue by 1975 to the United Nations or other international agency which might control access to the ocean floor is a wholly unsupported factual assumption, and an unacceptable premise for urgency in devising a regime to govern the deep ocean floor. It is significant that this estimate was based in part on the assumption that the sovereign rights of coastal nations should terminate at the 200 meter isobath, or at 12 miles from the nearest coast. As we have indicated, this would require agreement of the coastal nations to relinquish their exclusive rights in the minerals of the submerged continental land mass seaward of the 200 meter isobath, now recognized in them by the Convention on the Continental Shelf. As coastal nations comprise five-sixths of the membership of the United Nations, this does not seem a viable premise, quite aside from the illusory amount associated with it.

While it thus appears that there is no precipitate necessity for the structuring of a regime to govern the development of the minerals beneath the oceans seaward of the existing mineral jurisdiction of the coastal states, it is appropriate to recognize the necessity for studying and agreeing on a formulation of international legal principles based on existing customary international law which will encourage exploration and protect exploitation of the resources of the deep sea floor.

In the meantime, such initial mining operations as may occur in the deep ocean are unlikely to be the occasion for conflict which cannot be disposed of satisfactorily by available international legal principles and institutions. Deferment of attempted alteration of the regime has also the great virtue, surely to be considered an important objective, of delaying action until the dimensions of the problem are far more clearly apprehended than is presently the case. Experience gained with exploitive operations within the area of coastal control may well furnish us with the guidelines by which problems in the deeper regions beyond may be resolved in accord with the common interests of all.

2. Possible regimes or arrangements to control mineral development of the deep ocean floor

In view, however, of the very long time which will be required, or should be required, for negotiating a new international agreement for

* Statement of the Ambassador of Malta, H. E. Dr. A. Pardo, United Nations General Assembly, November 1, 1967.

the deep sea-bed (if such agreement is believed to be required), it is appropriate to investigate various alternatives. Three major choices are most frequently suggested.

(1) *The flag nation concept*

One concept is essentially that of *laissez faire*: let the appropriation and development of the minerals of the deep sea-bed continue to be undertaken by any nation willing to risk its treasure and the lives of its nationals to win those minerals.

(2) *Creation of an international licensing mechanism*

At the opposite end of the spectrum is the proposal for establishment of an international licensing authority. This presupposes the creation in some supranational agency of a new competence, not now existing, to grant or refuse reconnaissance permits, exploration licenses, and production concessions just as sovereigns now do within their national jurisdiction on dry land and on the continental shelf. Presumably the new supranational agency would, or could, control or prohibit production, set prices, control repatriation of capital and profits, and fix and collect taxes and royalties, as some sovereigns do. Neither the United Nations nor any other international entity now has competence to exercise such powers. Presumably the nations of the world, collectively, do have that competence, but they have not, singly or collectively, delegated it to the Assembly of the United Nations.

(3) *Registry and code of conduct*

A third and intermediate solution is the ultimate establishment of "norms of international conduct," to be obeyed by every nation whose flag is flown by an exploratory expedition. Coupled with this, the establishment, by international convention, of a central registry system, has been suggested as a refinement of the flag-nation concept. A two-fold concept seems indicated: registry of national claims, and a code of national conduct in the occupation and use of the areas claimed. These concepts find analogies in the existing mineral laws of many countries.

If such arrangements evolved on the pattern of existing national laws, notice would be recorded in an international registry office by the flag nation of the expedition, stating the intended occupation of specified areas, of predetermined permissible size. An exclusive right of occupancy, secured for a known time, would accrue to the recording nation, for the benefit of its licensees, with respect to the published area. The

right would remain exclusive, however, only so long as work continued in conformity with specified criteria. If minerals were found, their production would be governed by the laws of the nation which had registered the original notice of intent. In addition, it has been suggested that the availability of areas for mineral development, under the registry scheme, particularly the requisite distance offshore from adjacent states, would be determined by international convention and not by the registry office. Recognition of previously acquired rights is an essential of the scheme, as is the recognition of competing interests in the use of the marine environment, e.g., for fishing and navigation.

It would be appropriate in the development of a treaty covering these provisions to give consideration to the recommendation advanced by the United States Representative on June 20, 1968, to the Legal Working Group of the U. N. Ad Hoc Committee to Study the Peaceful Uses of the Sea Bed and Ocean Floor Beyond the Limits of National Jurisdiction for the "dedication as feasible and practicable of a portion of the value of the resources recovered from the deep ocean floor to world or regional community purposes."

The algebraic form in which the registry concept is here stated is deliberate. Some of the difficulties, including the problems of competing notices of claims, priorities, areas, duration, work required to keep claims alive, and so on, are self-apparent. No one knows as yet how to put numbers into any of these concepts. No one will know how to do so until after a great deal of deep sea exploration and discovery of minerals has taken place. This exploration, in our view, should be encouraged, not retarded.

While we prefer the intermediate solution (No. 3 above), we decline to characterize the flag nation concept (No. 1 above) as one that invites "anarchy" or "chaos" or "race to grab," as some have contended. This approach is not one characterized by the absence of law. On the contrary, we are of the opinion that under existing law a state has competence to establish limited rights of jurisdiction and control over minerals of the sea-bed by effective use of the area encompassing them. We are of the further opinion that, in the event of conflict between the mineral development projects of two or more nations, there are established principles of international law, now applicable to the high seas, which would be available to resolve such conflicts on an *ad hoc* basis. Nevertheless, we recognize that these existing principles may not provide an adequate basis for long-term development of these resources in an orderly manner. If a comprehensive legislative solution can be

designed in advance for this purpose, that possibility should be carefully explored.

We recommend against any attempt at a solution through the creation of an international licensing mechanism (No. 2 above), in the foreseeable future. To create and define the powers of such a supranational authority would be an enterprise rivaling in magnitude the creation of the United Nations itself. It could not be self-created by resolution of the Assembly. It presupposes that the maritime nations of the world would delegate to a super-sovereign the power to prevent their own exercise of powers, now possessed, to occupy and use the bed of the deep sea beyond national jurisdiction.

There is no reason why use of deep sea mineral resources should be made contingent upon the solution of political problems of such magnitude, or why exploration of the deep ocean floor should be prohibited pending the accomplishment of that solution (as some have suggested). It is enough to say that any scheme which adds costs, delays, and international politics to the formidable obstacles which already confront the would-be explorer of the deep sea-bed bears the burden of proving the necessity for its existence.

VI. CONCLUSIONS AND RECOMMENDATIONS *

1. *With respect to the gathering of factual information*

Full support should be given to the International Decade of Ocean Exploration, now being formulated, and to the continuance of the maximum international cooperation in the acquisition and exchange of information about the ocean floor.

There should not be any embargo on or prohibition of exploration of deep sea mineral resources pending the negotiation of an international agreement relating thereto. To the contrary, all possible exploration, research, and exchange of knowledge should be encouraged. There is no need to prohibit this desirable progress because of uncertainties as to who shall control production, if minerals are discovered.

2. *With respect to the area within the exclusive jurisdiction of the coastal nations over submarine mineral resources*

Since exploration and exploitation of undersea minerals is likely to occur earlier in the shallower waters of the oceans adjacent to the conti-

* Members of the Committee have exchanged views with members of similar Committees of the American Bar Association, in preparation of these Conclusions and Recommendations.

nents than in the abyssal depths, it follows that if jurisdictional uncertainties arise to impede such operations during the next several decades, such problems will be primarily related to the scope of the mineral jurisdiction which is already vested exclusively in the coastal states by the "exploitability" and "adjacency" criteria of jurisdiction which now appear in the Continental Shelf Convention. This uncertainty, if necessity for its resolution occurs, might be removed by consultation among the major coastal nations which are capable of conducting deep sea mineral development, looking toward the issuance by those states of parallel *ex parte* declarations. These declarations might appropriately restrict claims of exclusive sea-bed mineral jurisdiction, pursuant to the exploitability and adjacency factors of the Continental Shelf Convention, to (i) the submerged portions of the continental land mass, limiting this provisionally to a depth of, say, 2,500 meters, or (ii) to a stated distance (say 100 miles) from the base line, whichever limitation encompasses the larger area.* Such declarations might appropriately recognize special cases. Two such classifications suggest themselves: (i) In the case of states whose coasts plunge precipitously to the ocean floor (e.g., on the west coast of South America), the suggested 100-mile limit on sea-bed mineral jurisdiction would automatically operate on the deep ocean floor. (ii) In the case of narrow or enclosed seas, the principle of adjacency might appropriately carry coastal mineral jurisdiction to the median lines, even though these are beyond the continental blocks.

This proposal should not necessitate any amendment of the text of the Continental Shelf Convention. That Convention's differentiation between the coastal state's exclusive rights in sea-bed minerals, on the one hand, and, on the other hand, the non-exclusive status of the sea-bed with respect to research and other uses not related to mineral exploitation, would be retained. So also with the Convention's preservation of the high-seas status of the overlying waters.

It would, however, be both appropriate and desirable to reiterate these understandings in the recommended declarations. In the instance of scientific research, which is being increasingly impeded by the requirement of coastal consent for research undertaken on the continental shelf, these parallel declarations might be employed to secure greater protection for this vital activity.

* Mr. McCracken, while joining in the report, would prefer not to suggest figures.

3. *With respect to the regime which should be applicable to the minerals in and under the sea-bed, seaward of the limit of the coastal state's exclusive jurisdiction*

(1) We do not consider it admissible under present circumstances to vest jurisdiction in the United Nations or in any other international organization to administer an international licensing system with power to grant or deny exploration and production concessions with respect to undersea minerals.

(2) We think there should be created an international commission (including adequate representation of the maritime powers now engaged in oceanic research and mineral exploration), or vesting responsibility in an existing commission so constituted, with instructions to draft a convention (subject, of course, to ratification) which shall have as its objectives:

a. Creation of an international agency with the limited functions of (i) receiving, recording, and publishing notices by sovereign nations of their intent to occupy and explore stated areas of the sea-bed exclusively for mineral production, notices of actual occupation thereof, notices of discovery, and periodic notices of continuing activity, together with (ii) resolution of conflicts between notices recorded by two or more nations encompassing the same area.

b. Establishment of norms of conduct by sovereign nations with respect to the recording of the notices proposed in the preceding paragraph, and in the occupation of the sea-bed and exploration and production of minerals therefrom. The drafting commission could appropriately recommend for inclusion in the resulting convention, among other things, standards (or a mechanism to establish standards) relating to permissible areas for inclusion in exploration and production phases, periods of exclusive rights of occupancy, requirements of diligence as related to tenure, conservation, avoidance of pollution, accommodation with competing uses of the marine environment, etc. The instructions to the negotiating commission should stipulate that the resulting convention shall contemplate that the actual production and marketing of minerals discovered shall be controlled by the laws of the recording nation, and that that nation shall be held accountable for the conduct of those operating under its flag in the exploration and exploitation of minerals.

c. Establishment of (i) reasonable payments to be made, preferably to the World Bank, by the nation which undertakes mineral development, in areas seaward of coastal mineral jurisdiction, in the nature of development fees or royalties, and (ii) the purposes to which such rev-

enues, when received, shall be applied. These purposes should be restricted to international activities on which wide agreement can be reached, such as oceanic research, programs aimed at improved use of the sea's food resources to alleviate protein malnutrition, and the development of the natural resources of the less developed countries.

Respectfully submitted,

WOODFIN BUTTE
 LUKE W. FINLAY
 (Alternate: CARLOS J. ANGULO)
 WILLIAM L. GRIFFIN
 G. W. HAIGHT
 BRUCE HARLOW
 RALPH JOHNSON
 DOUGLAS M. JOHNSTON
 JOHN G. LAYLIN
 JOHN E. McCRACKEN
 MYRES McDUGAL
 JOSEPH W. MORRIS
 CECIL J. OLMSTEAD
 RICHARD YOUNG
 WILLIAM T. BURKE, *Rapporteur*
 NORTHCUTT ELY, *Chairman*

(Two members of the Committee, Messrs. Oscar Schachter, Director of Research, UNITAR, and Stanley N. Futterman, Legal Adviser for Special Political Affairs, Department of State, have asked that, because of their official positions, particularly in relationship to the work of the United Nations Ad Hoc Committee, their names not be included as sponsors of this report. The Chairman, nevertheless, wishes to acknowledge, with appreciation, the contributions made to the Committee's discussions by Messrs. Schachter and Futterman, as well as by Prof. Henkin, whose dissenting views are printed herewith.)

Dissenting Statement by Louis Henkin

I cannot subscribe to the Committee's report. In my view, its focus is narrow, its concerns parochial, and its proposals short-sighted. The *laissez faire* philosophy which permeates it is a dangerous anachronism. The positions it recommends would lead to a "grab" by the coastal states, especially the highly developed states, of resources which the President of the United States has declared to be "the legacy of all human beings." They would seriously damage other interests of all nations, including the coastal states, and eventually end "the freedom of the seas" in principal parts of the oceans.

I am particularly troubled by the proposed extension of the doctrine of the continental shelf to an area more than three times that originally contemplated. That recommendation is without foundation in the 1958 Convention, either in its language or in its history. It would grab for the coastal states the resources of one-quarter of all the ocean bed, and the area in which the principal mineral resources are believed to lie. Even in its narrow concerns, I believe this recommendation to be mistaken; the implication that it is better for entrepreneurs to deal with national governments without international regulation or intervention is a misreading of recent history and extremely short-sighted.

But the most serious consequences of a magnified continental shelf are not even mentioned. For while the doctrine of the continental shelf formally gives the coastal state sovereignty only for the purpose of exploiting mineral resources, exclusive jurisdiction for one purpose tends to expand to sovereignty for all purposes. The Committee's proposal would mean that, increasingly, one-quarter of the ocean—and in many ways the most important quarter—would tend to become territorial sea. Surely, it would soon be effectively barred to many other uses by other nations, including much navigation, scientific research, and defensive measures at sea that are important to national security and world peace.

*Comments by the Rapporteur and Chairman on
Professor Henkin's Dissent*

1. As to the jurisdiction of the coastal states: Professor Henkin apparently construes the Convention as though the exploitability criterion were not there; otherwise, his assertion that the submerged portion of the continental land mass encompasses "an area more than three times that originally contemplated" is irrelevant, because this is a comparison of the areas included within the 200 meter and 2,500

meter isobaths. But the exploitability criterion is there; it explicitly takes coastal jurisdiction "beyond that depth" of 200 meters; and if it is not limited to the continental land mass by the criterion of adjacency, as the Committee construes the Convention, then what other limit is to be found in the Convention? Professor Henkin does not tell us. The Committee proposes to limit, not extend, the exclusive coastal jurisdiction. Of course, we decline to limit it to the 200 meter isobath, since the Convention itself says coastal jurisdiction extends "beyond that depth," just as we decline to extend it to the median lines of the oceans, as some have construed the Convention.

2. As to the contention that the Continental Shelf Convention, construed as encompassing the seabed of the continental margin, would tend to expand coastal sovereignty over the superjacent waters: History does not support this assertion. The claims of the Latin American countries to 200-mile wide territorial seas antedate the Convention. The Convention's explicit dissociation of coastal control of the seabed from territorial sovereignty over the superjacent waters has been respected, so far as we know, irrespective of the width of the seabed area under coastal control. The Committee proposes that this be reaffirmed in declarations of coastal states limiting their seabed jurisdiction to the continental margin.

3. As to the deep ocean floor beyond coastal jurisdiction: It is strange to characterize as an "anachronism" the application of the principles of freedom of the sea to the bed of the sea, in order to maintain access to the world's submarine minerals for all mankind without discrimination. These principles have served mankind well for three centuries. It is curious to call "parochial" the Committee's call for international agreement on enlightened standards of national conduct which will assure that this accessibility continues, accompanied by recognition of one another's investments in undersea mineral development, and is not replaced by claims of exclusive territorial sovereignty. It is odd to call "narrow" our proposal that the nations which take the whole risk of developing the minerals of the deep ocean floor seaward of the coastal jurisdictions shall dedicate a portion of their gains, if any, to the welfare of other countries.

WILLIAM T. BURKE
NORTHCUTT ELY

APPENDIX

After the preparation of the foregoing Report, a report of the National Petroleum Council, dated July 9, 1968, entitled "Petroleum Resources under the Ocean Floor," became available.

It contains the following Appendix, prepared by Oliver L. Stone, Chairman-Designate of the Committee on Marine Resources of the Section of Natural Resources Law of the American Bar Association. It is reprinted here not as a part of this Report, but as a matter of information, because of its relevance to the interpretation of the Convention on the Continental Shelf.

REVIEW OF BACKGROUND AND NEGOTIATIONS
LEADING TO EXECUTION OF 1958 GENEVA
CONVENTION ON THE CONTINENTAL SHELF

The 1958 Geneva Convention on the Continental Shelf encompasses the "continental margin." *

The Convention, in article 1, defines the term "continental shelf" as follows:

"For the purpose of these articles, the term 'continental shelf' is used as referring (a) to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas; (b) to the seabed and subsoil of similar submarine areas adjacent to the coasts of islands." **

The definition, read in light of its history, may reasonably be interpreted as encompassing the "continental margin." ***

* The term "continental margin" is used herein as it is defined in the report to which this appendix is a part.

** The text of the definition and the preparatory work leading to its adoption indicate clearly that the exploitability test was not intended to extend the shelf regime to mid-ocean, but rather was intended to have some limitation to submerged areas reasonably "adjacent" to the coast. Evidence of this is revealed in the International Law Commission's (ILC) Report of its 8th Sess. (U.N. A/3159), pages 76-77, 81-82, hereafter cited as ILC Report; and in Fourth Comm. (Cont. Shelf), Off. Records, Vol. VI, U.N. A/Conf. 13/42, pages 3-4, 8-12, 15, 21, 24, 27, 33-35, 40, 42, 53, 55, and 88-92, hereafter cited as Fourth Comm. Report.

*** Since the exploitability criterion and the adjacency test potentially permit extension of the shelf regime to the outer edge of the "continental margin," that fact precludes all nations other than the littoral nation from asserting rights to shelf natural resources in this area.

1. *The history of the Convention's definition of the term "continental shelf"*

In the International Law Commission's (ILC) first draft of the definition (1951) the "continental shelf" was defined as covering:

"the seabed and subsoil of the submarine areas contiguous to the coast, but outside the area of territorial waters, where the depth of the superjacent waters admits of the exploitation of the natural resources of the seabed and subsoil."

At its 1953 session, however, ILC changed the definition and defined the shelf solely in terms of water depth, using 200 meters as the outer limit.

At its final session in 1956, the ILC again changed the definition of "continental shelf." This time the shelf was defined in substance as it appears in Article 1 of the Convention, embodying the alternate criteria of water depth (200 meters) and exploitability. The ILC explained its final definition as having been prompted by action taken by the Inter-American Specialized Conference on Conservation of Natural Resources: Continental Shelf and Oceanic Waters, held at Ciudad Trujillo (Dominican Republic) in March 1956. That conference had concluded that "the right of the coastal State should be extended beyond the limit of 200 metres, 'to where the depth of the superjacent waters admits of the exploitation of the natural resources of the seabed and subsoil'." (ILC Report, p. 41.)

In its final report on the definition, ILC makes clear that its definition departs from the strict geological concept of the shelf, stating (ILC Report, pp. 41-42):

"... the Commission therefore in no way holds that the existence of a continental shelf, in the geographical sense as generally understood, is essential for the exercise of the rights of the coastal State as defined in these articles."

And (*id.*):

"Again, exploitation of a submarine area at a depth exceeding 200 metres is not contrary to the present rules, merely because the area is not a continental shelf in the geological sense."

Further light is shed on the definition of the shelf, particularly the phrase "the submarine area adjacent to the coast," by ILC's commentary on its draft Article 68, which provides that the coastal State exercises over the shelf "sovereign rights for the purpose of exploring and exploiting its natural resources." The ILC points out that once

the seabed and the subsoil become an object of active interest to coastal States with a view to exploitation of their resources, "they cannot be considered as *res nullius*, i.e., capable of being appropriated by the first occupier. It is natural that coastal States should resist any such solution." (ILC Report, p. 43.) And then the commentary proceeds (*id.*):

"Neither is it possible to disregard the geographical phenomenon whatever the term—propinquity, contiguity, geographical continuity, appurtenance or identity—*used to define the relationship between the submarine areas in question and the adjacent non-submerged land*. All these considerations of general utility provide a sufficient basis for the principle of the sovereign rights of the coastal State as now formulated by the Commission. As already stated, that principle, which is based on general principles corresponding to the present needs of the international community, is in no way incompatible with the principle of the freedom of the seas." (Emphasis added.)

Thus, the ILC left no doubt that the "adjacent" areas to which the Convention relates includes the submarine areas having "propinquity, contiguity, geographical continuity, appurtenance or identity" with the continental land mass. The "continental margin" meets all of these criteria, although any one would suffice. It is, therefore, clearly encompassed by the Convention.

Additionally, the Ciudad Trujillo Conference of 1956 is of particular significance in construing the Convention's definition because it was the outcome of this Conference which prompted ILC to incorporate the exploitability test in its final (1956) draft of the definition. The Trujillo Conference (Committee I Report) reported:

1. "The continental shelf is from the point of view of geology, structure and mineralogical characteristics, an integral, although submerged, part of the continents and islands."
2. "There is no uniformity as regards the width, depth, and geological composition of the shelf, even in a single sea."
3. "The shelf is and constitutes a valuable source of natural resources, which should be exploited for the benefit of the coastal state."
4. "The extent of these resources is not known exactly, but it is believed that they bear a relation to the extent of the American shelf. . . ."
5. "Scientifically the term 'continental slope', or 'inclination' refers to the slope from the edge of the shelf to the greatest depths."

6. "Technical progress has been made [in exploiting the resources of the shelf] and there are exploitations at depths of nearly 1000 meters."
7. "The term 'continental terrace' is understood to be that part of the submerged land mass that forms the shelf and the slope."

From the foregoing points the Committee concluded:

"The American States are especially interested in utilizing and conserving the existing natural resources on the American terrace (shelf and slope)." (Words in parentheses appear that way in original.)

And:

"The utilization of the resources of the shelf cannot be technically limited, and for this reason the exploitation of the continental terrace should be included as a possibility in the declaration of rights of the American States."

The Conference * unanimously adopted a Resolution (Document 95) which reads:

"1. The sea-bed and subsoil of the continental shelf, continental and insular terrace, or other submarine areas, adjacent to the coastal state, outside the area of the territorial sea, and to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the sea-bed and subsoil, appertain exclusively to that state and are subject to its jurisdiction and control."

At the 1958 Geneva Conference on the Law of the Sea, the fourth Committee considered the draft articles on the Continental Shelf. In commenting on the definition, particularly the exploitation test, the spokesman for the United States delegation (Miss Whiteman) observed that (p. 40):

"The definition of the rights of the coastal State to the continental shelf *and continental slope* adjacent to the mainland proposed by the International Law Commission would benefit individual States and the whole of mankind." (Emphasis added.)

This expression of understanding of the definition by the United States made during the course of the debates, together with the fact that the United States had shortly prior thereto joined in the Ciudad Trujillo resolution of March 28, 1956, proclaiming that "the continental shelf, continental and insular terrace" appertain to the coastal nation,

* Twenty nations including the United States participated in this Conference.

places it in a uniquely strong position to announce its interpretation that the shelf regime encompasses the "continental margin."

Dr. Garcia-Amador, a delegate to the Ciudad Trujillo Conference, served thereafter as Chairman of ILC during its eighth session at which the definition of "continental shelf" was revised to include the exploitability test along with the 200 meters criterion. His views undoubtedly were significant in bringing about this change. He writes (Garcia-Amador, *The Exploitation and Conservation of the Resources of the Sea* (2nd ed., 1959, at p. 108):

"As we have indicated, the geographical configuration of the bed of the sea contiguous to the coast of continents and islands is sometimes so irregular that it cannot be defined in terms of the shelf or terrace concepts. When this is so, as in the case of some countries in the American continent and elsewhere, the coastal State may exercise the same exclusive rights now enjoyed by those *which have a continental or insular shelf and terrace*, provided the depth of the superjacent waters admit of the exploitation of the natural resources of the seabed and subsoil and that the submarine areas be adjacent to the territory of the coastal State." (Emphasis added.)

And continuing (*id.*, p. 130):

"... States enjoy present legal powers when the submarine area adjacent to their territory has the configuration of a shelf, defined by the limit of the 100-fathom line. Potential or future powers would be enjoyed by them, for example, according to the system adopted by the International Law Commission, with respect to *the slope and the corresponding part of the terrace*, and by all coastal States with regard to the other submarine areas adjacent to their territories. . . ." (Emphasis added.)

At ILC's eighth session (1956) at which consideration was being given to changing the definition of the continental shelf as it appeared in the 1953 draft (out to the 200-meter water depth line), Dr. Garcia-Amador proposed a definition substantially the same as that in the Ciudad Trujillo resolution of March 28, 1956. McDougal and Burke comment on this proposal as follows (*The Public Order of the Oceans*, by McDougal & Burke, p. 683):

"Some controversy attended the suggested elimination of the continental shelf term and the references to the 'continental and insular terrace', but this became muted when it was realized that a criterion embracing both a 200-meter depth and the depth admitting exploitation would embrace such areas if they were in fact exploitable or came to be."

A somewhat similar proposal by Panama was rejected by the Fourth Committee, no doubt for the same reason and also because the Panama proposal would not have automatically vested Convention rights to the 200-meter water depth contour (Report of Fourth Comm., pp. 32-33, 127).

Within the Fourth Committee the United Kingdom proposed an amendment to the definition to confer sovereign rights in the coastal nation for exploring and exploiting the natural resources "over the submarine areas adjacent to its coast but outside the territorial sea, up to a depth of 550 metres" (Report of Fourth Comm., p. 132). It was stated that "the continental slope ended in most places at that depth [550 meters]" (*id.*, at 36). The reasons underlying the rejection of this proposal are not specified, but it would appear that the delegates did not want to restrict the Convention's exploitability coverage to the specified depth limit.

2. *Subsequent action by nations*

Since the Convention went into effect in 1964, the United States by action taken by the Interior Department, has clearly evidenced its construction that the definition extends far beyond the 200 meter water-depth line. In 1961, the Associate Solicitor of the United States Department of Interior issued a memorandum concluding that the Secretary's leasing power under the Outer Continental Shelf Lands Act, read in light of the Convention on the Continental Shelf, extends to an area lying about 40 miles off of California in water-depths ranging up to 4,020 feet with the greater part being in excess of 600 feet. The Secretary has also issued oil and gas leases in water-depths up to 1,500 feet.

Moreover, the Secretary of Interior announced, in June 1965, that he had authorized approval of plans of a company to conduct a core drilling project on the Continental Slope in the Gulf of Mexico off the coasts of Texas, Louisiana and Florida in waters ranging in depth from 600 to 3,500 feet. This "permit" or authorization is not to be confused with the grant of an oil and gas or other mineral lease. It appears that this permit was issued pursuant to § 11 of the Outer Shelf Act and the Secretary made clear in the permit that "No rights to any mineral leases will be obtained from these core drilling programs." Also, on May 26, 1967, the U. S. Geological Survey announced approval of plans for another company or group of companies to conduct a core drilling program on the Continental Slope beyond the

continental shelf "off Florida and northward to points seaward of Cape Code and Georges Bank." The release states that "No rights to any mineral leases will be obtained from these core drilling programs". The release indicates that about 21 core holes will be drilled beneath the floor of the Atlantic Ocean in water ranging in depths from 650 feet to 5,000 feet. The depth of penetration in each core test is limited to a maximum of 1,000 feet.

In a letter opinion of February 1, 1967, from the Deputy Solicitor of the Department of Interior to the Corps of Engineers, it is made clear that the Department is of the view that Cortez Bank is an area under United States jurisdiction under the Outer Continental Shelf Lands Act and the Convention on the Continental Shelf. Cortez Bank is located about 100 miles from the California mainland and is separated from the mainland by ocean floor trenches as much as 4,000 to 5,000 feet deep, although the Bank itself is covered by shallow water.*

At the March 11, 1968, meeting of the United Nations Ad Hoc Committee to Study the Sea-Bed and Ocean Floor Beyond the Limits of National Jurisdiction, the spokesman for Canada said (A/Ac. 135/1, p. 33):

"In the view of the Canadian authorities, the present legal position regarding the sovereign rights of the coastal States over the resources of submarine areas extending at least *to the abyssal depths* is not in dispute." (Emphasis added.)

And, according to the U. N. press release of the March 21, 1968, meeting of the Ad Hoc Committee (U. N. Press Release GA/3585), the Canadian spokesman's views are reported thus (p. 2):

"The [Ad Hoc] Committee should define the limits of the area covered by the resolution [Gen. Ass. Res. 2340 (XXII)]. In his view, the areas over which coastal States had sovereign rights included, without doubt, the continental shelf *and its slope*." (Emphasis added.)

In view of the foregoing, the United States would be fully justified in asserting that the Convention on the Continental Shelf encompasses the continental margin.

* Barry, "Administration of Laws for the Exploitation of Offshore Minerals in the United States and Abroad", ABA National Institute on Marine Resources, 6/9/67, p. 12.

[End of Appendix by Mr. Stone.]

ELY AND DUNCAN,
COUNSELLORS AT LAW,
Washington, D.C., October 7, 1969.

THOMAS CLINGAN, Esquire,
*House Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR TOM: I enclose some material which I would appreciate having added to your record, following my testimony. It consists of a letter of inquiry from Luke W. Finlay, addressed to Dr. Garcia Amador, asking clarification of some frequently quoted remarks of Garcia Amador, during the negotiation of the Continental Shelf Convention in 1958. Dr. Garcia Amador's reply is most illuminating. I think it would be important to have this material available, in a place where we can all cite it, when necessary.

With kind personal regards,
Sincerely,

NORTHCUTT ELY.

STANDARD OIL COMPANY
INCORPORATED IN NEW JERSEY,
New York, N.Y., February 24, 1969.

Dr. F. V. GARCÍA AMADOR,
Washington, D.C.

DEAR DR. GARCÍA AMADOR: Some of the people favoring a narrow interpretation of the Geneva Convention on the Continental Shelf are making what I believe to be an improper use of a statement attributed to you, and I would greatly appreciate your assistance in clarifying the matter.

As you know, the Inter-American Specialized Conference on "Conservation of Natural Resources: The Continental Shelf and Marine Waters", held at Ciudad Trujillo in March of 1956, at which you served as Chairman of the Cuban Delegation, unanimously resolved to submit the following conclusion for consideration by the American states:

"To submit for consideration by the American states the following conclusions:

"1. The sea-bed and subsoil of the continental shelf, continental and insular terrace, or other submarine areas, adjacent to the coastal state, outside the area of the territorial sea, and to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the sea-bed and subsoil appertain exclusively to that state and are subject to its jurisdiction and control."

The report, attached as an appendix to the final act of the Conference, defines "continental terrace", as used in this resolution, as being "that part of the submerged land mass that forms the shelf and the slope". In turn, these two terms are defined as follows:

"(m) Scientifically, the term 'continental shelf' is understood to be that portion of the continent or island which is covered by the waters up to the point of declivity of the slope or edge of the shelf.

"(n) The limit of the shelf, the point of declivity of the slope or edge, varies according to the depth at which it occurs (from 120 to 365 m.).

"(o) Scientifically, the term 'continental slope', or inclination, refers to the slope from the edge of the shelf to the greatest depths."

The report goes on to add the following conclusions:

"I. The American states are especially interested in utilizing and conserving the existing natural resources on the American terrace (shelf and slope).

"II. As the edge of the continental shelf varies in depth, it is advisable to describe it conventionally as the submerged part of the continents or islands to depths of 200 meters (100 fathoms, more or less).

"III. The utilization of the resources of the shelf cannot be technically limited, and for this reason the exploitation of the continental terrace should be included as a possibility in the declaration of rights of the American states.

"IV. Adequate technical precautions should be taken in the laying of cables, oleoducts, and gas pipelines, in order to prevent accidents and avoid impediments to navigation and fishing.

"V. Governments should be urged to promote a better knowledge of the terrace (continental shelf and slope) and its resources."

A few weeks later the International Law Commission (ILC) of the United

Nations convened for its eighth session and, after electing you as Chairman, proceeded to consider, among other things, the term to be recommended for inclusion in what eventually became the 1958 Geneva Convention on the Continental Shelf. The proceedings of this session are set forth in Volume I of the *Yearbook of the International Law Commission, 1956*, and subsequent references will be to the pages of that volume.

At the outset of the discussion on the continental shelf, you proposed (p. 131) the inclusion of the following language in the convention:

"Article 1

"1. As used in these articles, the expression 'submarine areas' refers to the soil and subsoil of the submarine shelf, continental and insular terrace, or other submarine areas, adjacent to the coastal State outside the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas.

"2. Likewise, as used in these articles, the expression 'natural resources' refers to the mineral riches of the soil and subsoil of the submarine area, as well as to the living resources which are permanently attached to the bottom.

"3. In the other articles of the draft, the expression 'submarine areas' would be substituted for the expression 'continental shelf.'"

You then referred to definitions of the continental shelf, continental slope and continental terrace, adopted by the International Committee of Scientific Experts at Monaco in 1952, which were generally similar to those used at Ciudad Trujillo.

After some discussion of the pros and cons of your proposal to substitute the term "submarine areas" for the term "continental shelf", you made remarks which are reported (at p. 136) as follows:

"6. He did not wish to press the part of his amendment introducing the concept of the continental terrace, since the adoption of the second point relating to the depth at which exploitation was practical would automatically bring that area within the general concept. He would, however, request the Commission to take a decision on the right of States to exploit the natural resources of the seabed in adjacent waters to whatever depth was practicable. With that addition, the article could be referred to the Drafting Committee."

After further discussion, your proposal for incorporation of the exploitability concept was summarized and favorably acted upon (p. 139) as follows:

"45. Mr. Padilla-Nervo pointed out that what in fact the Commission had to vote on was the Chairman's proposal to incorporate in article 1 the concept contained in the words 'or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas.'"

It seems perfectly clear to me from this record that the language actually accepted by the ILC and later incorporated into the Geneva Convention was intended to be entirely equivalent in legal effect to the language adopted at Ciudad Trujillo. However, some of those who are attempting to limit national jurisdiction of the coastal states to the 200-meter isobath seek to gain support for their position from a statement of yours which is reported at page 135 as follows:

"95. The Chairman, in reply to Mr. Scelle, pointed out that the words 'adjacent to the coastal State' in his proposal placed a very clear limitation on the submarine areas covered by the article. The adjacent areas ended at the point where the slope down to the ocean bed began, which was not more than 25 miles from the coast."

I have great trouble with this statement on two counts. In the first place, the definition of "continental terrace" utilized both at Ciudad Trujillo and at the Eighth Session of the ILC made it perfectly clear that it was your intention that the exploitability test should extend national jurisdiction not to "the point where the slope down to the ocean bed began", but to the *lower* extremity of "the slope from the edge of the continental shelf to the greatest depths." In the second place, there are parts of South America off Argentina where the continental shelf extends several hundred miles before it even reaches a depth of 200 meters, so that you could not possibly have intended to impose a 25 mile limitation on the extent of coastal nation jurisdiction over natural resources under the convention.

As I read the official text of the Geneva Convention on the Continental Shelf, it fully supports the position adopted at Ciudad Trujillo and advocated by you at the Eighth Session of the ILC; namely, that coastal nation jurisdiction over

*This proposal was adopted by 7 votes to 5, with 3 abstentions.

the natural resources of the seabed and subsoil of adjacent areas extends over the entirety of the continental terrace to the point where the outer edge of the submerged continent meets the oceanic crust of the abyssal ocean floor and also makes provision for the special case of those nations whose coasts drop abruptly to great depths.

I am unclear in my own mind whether the statement reported at page 135 of the ILC proceedings was an incorrect transcript of what you actually said, or whether there is some other explanation of its apparent inconsistency with the basic scope of the convention for which you were pressing. Whatever the answer is, I am satisfied that it has no juridical significance in undoing the inter-American conclusions at Ciudad Trujillo, but I would be most grateful to you for any clarification that you could give me.

I apologize for the length of this letter, but as I am asking for your recollection on a matter some thirteen years in the past, I felt it only fair to give you a reasonably complete background.

Sincerely yours,

LUKE W. FINLAY.

PAN AMERICAN UNION,
Washington, D.C., March 12, 1969.

MR. LUKE W. FINLAY,
Manager, Government Relations Department,
Standard Oil Co.,
New York, N.Y.

DEAR MR. FINLAY: I take pleasure in referring to your letter of February 24 concerning the doubts caused by the cited paragraph from the Summary Record of the International Law Commission (p. 135 of the ILC Yearbook, 1956, Vol. I).

In the first place, I must admit that as this paragraph stands it makes me appear as saying that the submarine areas never have an extension greater than 25 miles. This is clearly a case of an error of interpretation on the part of the *précis*-writer and of my own negligence in failing to review the draft summary record and make the correction.

However, this is simply an error since I could never have made a statement that presupposed an extremely restrictive position at the very time when I had taken the initiative to propose the broadest, most flexible formula yet know, i.e., the formula approved by the Inter-American Specialized Conference which had been held in the capital of the Dominican Republic scarcely two months prior to the ILC session.

I can only reiterate my statement, made when proposing the use of the expression "submarine areas", to the effect of requesting "the Commission to take a decision on the right of States to exploit the natural resources of the sea-bed in adjacent waters to whatever depth was practicable" (p. 136). It seems that it was with this unrestrictive, flexible criteria, most favorable to the coastal state's special interest in the exploitation of the resources of its adjacent submarine areas, that both the ILC and later the first Geneva Conference on the Law of the Sea approved the definition that appears in Article 1 of the Continental Shelf Convention of 1958.

Sincerely yours,

F. V. GARCÍA-AMADOR,
Director, Department of Legal Affairs.

(Whereupon, at 12:25 p.m. the committee adjourned, to reconvene for further hearing at 10 a.m. Wednesday, August 6, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

WEDNESDAY, AUGUST 6, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:15 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The committee will resume its hearings for the consideration of the legislation that is before the committee, jointly sponsored by the chairman of the full committee and the 20 members of the subcommittee, as well as for the purpose of the consideration of the Commission's report.

We are delighted and honored this morning, gentlemen, to have with us a very distinguished North Carolina citizen, the Honorable Robert Scott, Governor of North Carolina, whose father served North Carolina in a splendid manner as the Governor of North Carolina and a former U.S. Senator, rendering yeoman service to his State and his Nation.

I want to recognize, if I might, at this moment the chairman of the full committee, Mr. Garmatz, for any remarks that he might care to make.

Mr. GARMATZ. Thank you, Mr. Chairman.

I want to take this opportunity today to welcome the Honorable Robert Scott, the distinguished Governor of North Carolina.

It is a pleasure for me to personally extend greetings to Governor Scott. I would like to say that my pleasure is doubled by the fact that another distinguished North Carolinian, my good friend and colleague, Congressman Alton Lennon, is chairman of the subcommittee.

I think it is appropriate to note that in addition to serving so ably as chairman, Congressman Lennon is also the ranking majority member on two other important subcommittees. These are the Subcommittees on Fisheries and Wildlife Conservation, and the Subcommittee on Coast Guard, Coast and Geodetic Survey and Navigation.

I certainly do not want to embarrass Congressman Lennon; however, I think it is important to point out the vital role he plays in all these activities, besides serving so capably on the House Armed Services Committee.

In welcoming Governor Scott, I just want to let him know that we on this committee really value the talents and energy of Congressman Lennon. Besides being an active and dependable member of my full

committee, he is constantly on the alert regarding legislation and issues affecting his home district and his home State of North Carolina.

I am also pleased to note that still another Representative from North Carolina—Congressman Walter B. Jones—is serving this subcommittee with distinction. Mr. Jones was elected to represent the same congressional district in North Carolina that was so ably represented by our former chairman, the late Honorable Herbert C. Bonner. I am happy to see that he is following the outstanding example set by our former chairman, Herb Bonner.

So, Governor Scott, we want you to know that you are most welcome here today. And I would also like to say that, if you have any more legislative talent hidden in North Carolina (that is not already serving here in Congress) do us a favor—send them to Washington, and we will welcome them with open arms.

I might add one last sentence: As long as they are Democrats.

Mr. PELLY. Mr. Chairman, would the gentleman yield?

Mr. LENNON. Would the gentleman yield to the gentleman from the State of Washington?

Mr. GARMATZ. One minute, yes.

Mr. PELLY. I just want to say for our side of the aisle that we share your feelings of pride in our chairman and welcome his Governor and the first citizen of North Carolina here today. As for any other statement, I don't wish to make any comment.

Mr. MOSHER. Will the gentleman yield?

Mr. GARMATZ. I yield.

Mr. MOSHER. I think the fact that the Governor is here indicates the good regard that he and his fellow citizens of North Carolina have for our chairman. It is one that we share on both sides of the aisle. Having seen Mr. Lennon in action, I would be ready to assume that any additional Republicans that come from North Carolina, also thinking in terms of the high quality of the Republicans we already have from there, would be very welcome in this body.

Mr. LENNON. Gentlemen, I guess I will have to declare time off limits. I am grateful for the generous and gracious remarks of the chairman.

In connection, gentlemen, with the appearance of our distinguished visitor and witness this morning, some of you gentlemen will recall my having referred to this earlier because I called upon the members of the subcommittee individually where I could and in general conversation and suggested to them that they, representing coastal areas or any areas bordering on any waters, estuarine or otherwise, take the action that the three members from North Carolina, Congressman Henderson and Congressman Jones and I did on October 10th of 1967. We jointly wrote to the then Governor of North Carolina and suggested that, even though it could not be done by legislation, that he appoint an ad hoc committee which we thought he would refer to or designate as the Marine Science Commission to coordinate marine activities of our State.

We learned approximately a year later, to be exact October 30, 1968, that Governor Moore had appointed such a Marine Science Commission for the State of North Carolina. We had a very pleasant visit in January of this year by Dr. Walton Jones, who is here this morning, the executive secretary of the Marine Science Council of our State. He

was accompanied by Col. James Smith of the Research Triangle, and at that time some of us from North Carolina suggested to him that he recommend to the Governor of North Carolina that the General Assembly in its then-sitting session this year give this Council statutory authority or basis. This was done, and we are grateful for that because we think it will be effective.

Now, Governor Scott, if you and those witnesses who will participate with you will have a seat at the witness table, we will be delighted to hear from you.

I think each member has been provided with a copy of Governor Scott's statement, and he has indicated to me that he prefers that you tell him a question rather than ask him one, and he has competent experts with him who can respond to any questions posed by the gentlemen of the subcommittee.

Mr. GARMATZ. Mr. Chairman, will you yield for a moment?

Mr. LENNON. Yes, Mr. Chairman.

Mr. GARMATZ. I wonder if the chairman would be so kind as to introduce the members of the committee personally to the Governor.

Mr. LENNON. Well, I will be delighted to do that. I will let you do that yourself, starting with my friend from the First District of North Carolina on the right. Go ahead for the record. Introduce yourself to Governor Scott since you have known him all your life and are a close friend of his.

Mr. JONES. Congressman Jones of North Carolina.

Mr. LENNON. Congressman Dave Henderson, who is not a member of our committee but a great member of two important committees with respect to North Carolina, the Post Office and Civil Service Committee and the Public Works Committee.

Congressman Karth of Minnesota, a very distinguished member of this Committee and also of the Science and Astronautics Committee.

Congressman Tom Downing of Virginia, also a member of the Science and Astronautics Committee.

Congressman Charles Mosher, the ranking minority member of this subcommittee, from the State of Ohio.

Congressman Tom Pelly from the State of Washington.

Congressman Hastings Keith from the great State of Massachusetts; and Congressman Schadeberg, who is a dedicated and fine member of this subcommittee.

Now, gentlemen, we would be delighted to hear from you.

STATEMENT OF HON. ROBERT SCOTT, GOVERNOR OF NORTH CAROLINA; ACCOMPANIED BY DR. E. WALTON JONES, ACTING DEAN OF UNIVERSITY EXTENSION, NORTH CAROLINA STATE UNIVERSITY, AND EXECUTIVE SECRETARY, GOVERNOR'S COUNCIL ON MARINE SCIENCES; AND DR. JOHN LYMAN, HEAD, OFFICE OF MARINE SCIENCE, CONSOLIDATED UNIVERSITY OF NORTH CAROLINA

Governor SCOTT. Thank you, Mr. Chairman, Chairman Garmatz, and members of the subcommittee.

First of all, if I may, Mr. Chairman, I would like to respond to the comments by the committee chairman and say that we are grateful

for the service rendered by our distinguished Congressman as members of your committee, and I was pleased to note that you recall our beloved Congressman Herbert Bonner, a man whose name is still revered in North Carolina for his long tenure in the Congress and for the great service he rendered not only to his District but, indeed, to the State and to the Nation.

We are pleased, of course, with the comments you have made with respect to the service of our Congressmen. I would suggest, sir, however, that when you commented about anyone else's coming, that it would be probably not in their place but in the event that they should not choose to come later.

Mr. Chairman and members of the subcommittee, I do appreciate the opportunity to appear before you today to discuss the report of the Commission on Marine Science, Engineering and Resources. The Commission's report and the hearings of this subcommittee are of particular interest to me because of the commitment that North Carolina has made to develop the full potential of its marine resources. The General Assembly, which only recently adjourned, and to which the chairman referred in his opening remarks, passed several pieces of legislation, upon my recommendation, to help the State realize this potential.

A bill was passed to continue, on a permanent basis, the Governor's Council on Marine Sciences, and this has now become a statutory agency. This Council will help pull together the efforts of all agencies and institutions and permit us to concentrate on specific objectives. The Council will help relate research, educational and regulatory functions to the practical needs of our marine industries. It will also keep me apprised of how State government can be of greater assistance in bringing about full and wise usage of our marine resources.

The same General Assembly appropriated \$1.8 million to help carry out plans that the Council is developing with our agencies and educational institutions over the next two years. These plans are tied closely to the program now being administered by the Office of Sea Grants and that of the Coastal Plains Regional Commission.

Another significant act of this General Assembly should be mentioned in that it indicates something regarding the philosophy of our State as we proceed to develop our marine resources. An appropriation of \$500,000 was made to purchase estuarine lands to preserve the quality of the marine environment. We do not intend to exploit our valuable resource base for the sake of short-term gains. The nursery grounds for marine life must not be permanently damaged by commercial development.

I would like to take just a few minutes, Mr. Chairman, to highlight some of the significant facts regarding marine resources in North Carolina. The State of North Carolina ranks fifth among the 50 States in its length of general tidal shoreline. This tidal shoreline of just over 1000 miles represents almost 10 percent of the shoreline of the 48 contiguous States.

Only Florida (by slight margins), California and Texas exceed North Carolina in the length of the general tidal shoreline.

The State also has more than 2,500 square miles of saltwater bays and sounds. The State has over 15,000 square miles of Continental Shelf offshore with some 1,130 square miles of it included within the State's legal boundaries. A 267-nautical-mile section of the Intracoastal

Waterway, with a project depth of 12 feet, traverses the State. Major seaport complexes exist at Morehead City and in the Cape Fear River, including the Port of Wilmington, which, of course, is the home of the chairman.

The estuarine and coastal areas of North Carolina are currently being used for commercial fishing, sport fishing, other seashore recreation, mineral recovery, scientific research, waste disposal, wildlife protection, water transportation and communications. Some of these uses are incompatible with others. Conflicting claims for marine resource use represent some of the most serious problems facing the State. It is for this reason that we endorse the Commission's recommendations concerning the creation of coastal zone authorities and coastal zone laboratories.

Commercial fishermen of North Carolina harvest annually around 20 million pounds of foodfish, some 20 to 30 million pounds of shellfish, and close to 200 million pounds of menhaden and related types of fish for processing into oil and meal. Sport fishermen catch an estimated 10 million pounds of saltwater fish annually in North Carolina.

From the point of view of scientific research relating to the ocean, North Carolina provides a broad variety of habitats. North Carolina offers an unusual number of diversified areas in which to conduct research. In most of its estuaries, tides and tidal currents are almost nonexistent.

Therefore, these estuaries constitute a habitat in which conditions can be contrasted with those of other waters where intense tidal agitation is present. Onslow Bay provides a 100-mile stretch of coast that receives virtually no river runoff. Therefore, its waters are more free of silt than any other comparable stretch of the Atlantic seaboard. Not so far offshore, coral reefs exist farther north than anywhere else in the world.

The cold wall of the North Atlantic meets the warm waters of the Gulf Stream at Hatteras and hence the North Carolina coast is both the southern limit of such northern forms as the lobster and cod and the northern limit of tropical species like the sailfish and dolphin. In order to take advantage of this wide variety of habitats available nearby, the Bureau of Commercial Fisheries and Atomic Energy Commission located the Radiobiological Laboratory at Beaufort, N.C.

The Bureau of Commercial Fisheries already had a biological laboratory in Beaufort devoted to study of the regional fisheries. In addition Duke University has a marine laboratory located in Beaufort. This laboratory is the recipient of a grant from the National Science Foundation which enables it to operate a 117-foot biological research vessel known as *Eastward*, in a cooperative research and training program for the entire Southern Atlantic region.

The University of North Carolina has located its institute of marine science at Morehead City. It operates a 48-foot research vessel. Adjacent to the institute is the laboratory of the State Department of Commercial Fisheries, with its 70-foot exploratory fishing ship, the *Dan Moore*.

Farther south, at Wilmington, the Cape Fear Technical Institute has an advanced program of training in marine technology whose 185-foot training and research vessel has just returned from participation in the BOMEX project.

The Wilmington area also has the Wrightsville Beach Biomedical Laboratory, a joint project of North Carolina's three medical schools, which conducts research on the physiology of deep diving. Wilmington College, which on July 1 became the Wilmington Campus of the Consolidated University of North Carolina, has a great interest in the area of marine science and marine resource development. Nearby is the F. J. LaQue Laboratory, where a large nickel company conducts fundamental studies of the effect of the marine environment on the behavior of materials, as well as a pilot desalination plant of the Office of Saline Water.

Mr. Chairman, this listing by no means exhausts the catalog of marine research activities making use of the favorable settings along the North Carolina coast. The Pamlico Marine Laboratory of North Carolina State University, at Aurora, is engaged in a broad program of investigating the possible effects on estuaries of resource utilization, such as power production and phosphate mining. At Hatteras, North Carolina State University has a fisheries laboratory. East Carolina University is developing a marine science facility at Manteo.

In the well known triangle, Duke University at Durham, University of North Carolina at Chapel Hill, and North Carolina State University at Raleigh all have on-going programs of research and graduate education in the marine sciences. The two campuses of the Consolidated University of North Carolina have strengthened their programs in oceanography by adding faculty to augment existing programs in marine ecology, ocean engineering, food science, marine geology and geophysics.

Duke University offers training in marine biology and geology, as well as in ocean engineering and in programs related to its unique facility for measuring the ability of persons to live and perform under extreme temperature and pressure conditions prevalent in deep water. The Research Triangle Institute is also concerned with problems of the ocean. Some of its scientists currently are engaged in the Bomex experiment.

This brief inventory of the ongoing marine research and development activities in the State emphasizes the strong existing strength of our marine science program in North Carolina. We are fortunate in possessing academic institutions fully capable at the present time of serving as the nuclei of one or more coastal zone Laboratories of the kind visualized by the Commission in the second chapter of its report. My administration likewise is prepared to move rapidly in the establishment of a coastal zone authority for North Carolina as soon as the appropriate guidelines can be established by the Federal Government, as recommended on page 57 of the Commission report.

Now, Mr. Chairman, let me turn to consideration of some of the specific recommendations of the Commission.

It seems to us that the recommendations of the Commission can be divided into three main categories. One of these categories concerns the recommendations of the International Panel of the Commission, which deal primarily with the International legal-political framework of exploring and utilizing the oceans. The second category of recommendations involves the restructuring of the Federal Government to create a National Oceanic and Atmospheric Agency.

The third, and by far the largest category, is a series of specific recommendations for administrative or organizational action designed to correct shortcomings in the present national oceanographic program as they were identified by the Commission.

We urge the Congress to recognize that the Commission's recommendations can be logically separated as indicated above. We recognize that many different groups in the United States have ideas concerning the optimum legal-political international framework for the oceans and that some of these ideas conflict directly with the Commission's recommendations. We recognize also that it may take years of negotiation, within or without the framework of the United Nations, to bring about an international consensus on the legal-political regime for the oceans. However, we strongly urge the Congress not to delay action on the Commission's recommendations that concern purely internal matters until these international affairs are finally settled.

Action on domestic matters, in our view, can easily be separated from action on international matters, and domestic legislation can be pursued quite independently while the international matters are untangled.

Turning now to the recommendations concerning creation of the National Oceanic and Atmospheric Agency (NOAA), we again recognize in these the seeds of controversy. It is not realistic to expect the administrator of a government agency to willingly give up part of the mission, functions or staff of his agency. However, it is apparent that a more coordinated program in oceanography is needed.

For a decade, Government witnesses before congressional committees have maintained that adequate Federal coordination of oceanographic matters existed. For example, in March 1959 the Special Subcommittee on Oceanography of the House Merchant Marine and Fisheries Committee was informed that "coordination among interested Government agencies is accomplished informally through the Coordinating Committee on Oceanography established by the Office of Naval Research in 1956 * * * this group will insure that a national program in oceanography is properly managed and well coordinated throughout the Federal agencies concerned." (Oceanography in the United States, 1959, p. 135.)

Yet within a year the White House found it necessary to create, on a more formal basis, the Interagency Committee on Oceanography under the Federal Council on Science and Technology. In June 1961, there was testimony from its Chairman, and I again quote :

The Interagency Committee on Oceanography has, I sincerely believe, demonstrated that it can effectively coordinate the oceanographic programs of the various Federal agencies." (Oceanography 1961, phase 3, p. 150.)

This statement, incidentally, was made at hearings on a bill that would have created a National Oceanographic Council, a body that did not come into existence until 5 years later as a result of growing national dissatisfaction with the Interagency Committee on Oceanography as a means of effectively coordinating a national program.

These references emphasize the difficulty of recognizing the need for and the means of bringing about effective coordination of programs of this type. The Commission, composed of disinterested individuals,

should have been able to examine the problem of national organization for marine science and marine resource development in its true perspective. We urge that the Congress give due weight to the recommendations of the Commission in the matter of governmental reorganization.

Turning now, Mr. Chairman, to the third category of the Commission's recommendations, we wish to draw the attention of this committee to those that we believe are of most interest to the State of North Carolina. These recommendations relate to the coastal zone. They appear in detail in part III of volume 1 of the panel reports of the Commission.

The most important of these recommendations is that Federal legislation establish State coastal zone authorities whose functions shall include planning, regulation (including zoning where necessary), funding, acquisition, development, and enforcement. We strongly urge that the Congress take immediate action to implement this recommendation. The broader problem of the overall structure of the Federal Government for marine affairs is not of equal urgency.

For the present, the Federal operations concerned with coastlands acquisition, marine sanctuaries and shoreline boundaries can all adequately be handled within the framework of existing Federal agencies. Legislation concerning the establishment and operation of the coastal zone authority program should be drafted to set it up initially under an existing agency with an understanding that the function could be transferred later if an overall Federal agency is created.

We fully concur with the recommendations concerning creation of coastal zone laboratories under the national sea grant program. Again, we strongly urge prompt congressional action in implementing this phase of the Commission report.

We likewise concur generally with the Coastal Zone Panel recommendations on the need for Federal surveys and projects, on systematic approaches to waste management, and on other problems in the coastal zone that were identified by the Commission as requiring immediate action.

The recommendations of the Commission are important and in general the State of North Carolina endorses the report. In closing, let me call attention to the need, however, for a strong national commitment to ocean exploration. This will take money—more than this country has been willing to devote in the past. The State of North Carolina has enough faith in the potential of the ocean to become a full partner with the Federal Government in launching an all-out effort which would benefit all the people of this Nation and the world.

Mr. Chairman, the State of North Carolina through the leadership of my administration and with the support of the general assembly has made its commitment to developing the potentials found in what we like to call the new frontier of marine science and found right at our own back door. We ask the Federal Government to do likewise.

Mr. LENNON. Thank you, Governor Scott, for an interesting and informative statement. This is the kind of statement for North Carolina that I am delighted is in the record, because it indicates the interest and concern and the motivation and the progress which the State is making.

It is my judgment that all Coastal States and all States affected by the Commission's report should take similar action to implement and coordinate its activities in this field.

Now, the gentleman from Ohio, Mr. Mosher.

Mr. MOSHER. Mr. Chairman, I must say that Governor Scott's testimony this morning is an eye opener for me. Frankly, I had not recognized the variety and extent of oceanographic opportunities that exist in your State and the variety and extent of the activities already underway there. I certainly salute you and I can certainly understand our chairman's energetic interest in this whole field when I realize what an important role your State is playing.

Also I am impressed with your strong support for the recommendations of the Stratton Commission, and I especially note at the top of page 8 that you seem to suggest that our top priority for Federal legislation should be legislation which would authorize the establishment of State Coastal Zone Authorities. You put that even ahead of reorganizing and coordinating the Federal executive agencies in this area.

Also I was interested on page 2, at the bottom, in your recognition that some of the activities in this area are incompatible with other activities, where you say there are conflicting claims for the marine resource use and this creates some serious problems, and it is for that reason that you endorse the commission's recommendations concerning the creation of coastal zone authorities and coastal zone laboratories.

Then on page 5 you indicate what steps you are already taking to implement those recommendations.

Do you want to say just a little bit more, Governor, about how in practice the establishment of these coastal zone authorities and coastal zone laboratories would solve the problem of incompatibility and conflicting claims?

Governor SCOTT. Yes, I would be happy to elaborate briefly on that.

In North Carolina, of course, as I suppose is to be found in every coastal State, there obviously are conflicting uses of marine resources. For many years in our State we have had running battles between the commercial fishing interests and the sports fishing interests. Also we have had a conflict of interest in those who would wish to provide dredging in certain areas to open up channels into areas and whether or not this would disturb the nursery areas for marine life, and a number of conflicts.

In North Carolina, recognizing that there were a number of individual activities going on some by State-supported institutions of higher learning and some by private institutions, we have established the Marine Sciences Council as a statutory agency to try to pull all of this together to provide a coordinating approach.

We feel that with the establishment of the coastal zone authority, then we will be in a stronger position to move to bring about the necessary coordination, to bring together the varied interests and resolve some of these conflicts and further with the establishment of the laboratories we can move, I think, more effectively into the whole broad area of research. This is really one of the keys to the proper development of this whole marine resource use.

Mr. MOSHER. You conceive of these Coastal Zone Authorities as

having very substantial authority, I judge, to really, in case of necessity, knock heads together?

Governor SCOTT. Yes, sir. I would say that if the authority is going to be effective, it would of necessity have to have teeth.

Mr. MOSHER. It would have to be an umpire that really could say, "You do this and you do that," and that sort of thing.

Governor SCOTT. Yes, sir. I do believe that because, as I say, this age-old conflict with some of the varied interests has been with us for a long time and the matter of voluntary arbitration and getting together has not necessarily worked every time.

Consequently an authority could bring about some of the needed action that we have been unable to bring about thus far.

Mr. MOSHER. Now, the type of authority that you are talking about would be established by State law? You refer at the top of page 8 to, "The most important of these recommendations is that Federal legislation establish State coastal zone authorities," but could the type of authority that you are talking about so far as North Carolina is concerned be established by State legislation?

Governor SCOTT. I think it would depend upon the overall broad type of program that would be implemented. If it were going to be somewhat of a piecemeal program, then perhaps the individual States could do it. Obviously we could.

But if this is to be a national program with all the States participating, then it would seem to me that the Federal legislation would be needed. Otherwise some States might implement an authority, others might not.

I think to be really effective as far as the national program would be concerned that we would need this type of thing all up and down the seashore.

Mr. MOSHER. Mr. Chairman, I think we should take note of the Governor's strong feeling that there is need for national legislation at this point and give serious consideration to that.

Mr. LENNON. We certainly shall.

Thank you, Mr. Mosher.

The gentleman from Florida, Mr. Rogers.

Mr. ROGERS. Thank you, Mr. Chairman.

Governor, your statement certainly shows the interest of North Carolina which we have known about, of course, through our chairman. I am sure you are aware of his leadership and the effort he has put forth to try to get this Nation moving into the sea. He has done a magnificent job here in the Congress and I know that North Carolina is proud of him, and the delegation are proud of you and what you are doing in Carolina.

Do you have any difficulty getting your State Assembly to go along with appropriating funds for marine activities?

Governor SCOTT. No, sir. We found them receptive and there was no real quarrel about it, even the appropriations therefor.

Mr. ROGERS. This is what we need to learn from you because we have difficulty getting the executive branch up here, as well as the Congress, to give enough funds. I would agree with you that I think when people adequately understand the benefits that will come from developing the resources of the sea and handling our natural resources properly, then we can generate enough interest.

Your State certainly is an example of what is happening, and my State, too. I think they have grasped the importance of this.

I was interested in your suggestion that rather than tackle the Government reorganizational plan immediately, it would be well to move into the coastal zone authority as well as coastal zone laboratories. I would agree with you that this probably could be done and started although I would hope we would not hold back at the same time on the governmental reorganization.

I don't know why it cannot be done concurrently. We will have, I presume, a balancing for funds that we are going to have to consider, but I would think, if we can at least initiate the legislation to allow the States to proceed, that this would be helpful.

I think your suggestion will be helpful to the committee in placing priority on action. I commend you for your interest and for what your State is doing, and I hope that we can move the Congress likewise.

Governor SCOTT. Thank you.

Mr. Chairman, may I just comment to the gentleman's statement that I think one of the reasons that we in North Carolina were able to enact the legislative measures which I mentioned here in my prepared statement was the fact that people are becoming more conscious in our State of the potential we have in the marine science area. There has been a lot of discussion about this in government and in the private sector in recent months. They have seen a lot of these individual activities going on that I referred to.

With reference to the money, of course, obviously the administration would have used any amount the General Assembly would have seen fit to appropriate on beyond, but we were very pleased with this initial effort, and I think we are now committed to an aggressive program of developing our marine resources.

I would say that there is a prevailing spirit of excitement in North Carolina about this potential that we have. We have very obviously seen what the State of Florida has done and the State of Texas and California, and some of these other areas that have been in this field for some time, and we look right here at our back door and see that we have the same opportunity and think: Why not make use of this potential? So that it is catching fire and we are very excited by it in North Carolina.

Mr. ROGERS. That is encouraging. I think many people here in Washington have not realized the broad base of support that the development of the seas will bring. This has not yet been grasped by some. I hope we can encourage this interest so that they will see the purpose of the development and the need for support.

Thank you.

Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Rogers.

Mr. Pelly.

Mr. PELLY. First, Governor Scott, I want to thank you for mentioning the contributions by our late Chairman and great friend, Herb Bonner. I don't think many people recognized what a tremendous record he had for the Nation, and I, for one, was very happy that you haven't forgotten that.

When some of us were singled out and introduced to you, mention was made that some of us were on the Science and Astronautics Com-

mittee. I wonder if you would agree with me, and this is my own view, that these great scientific achievements in going to the moon have demonstrated one thing, and that is that we have to look more to the frontiers in our own globe for finding food and minerals against the growing population of this country. I don't think we are going to find a refuge or resources in the moon or Mars or anything else.

Now, If that same spirit of achievement is translated into a new agency in government to explore our own sea and seabed, it is going to provide what maybe the last source of protein and other needs for the people. Haven't you come to the conclusion that to watch men walk on the moon points up the fact that right here is where we have to start plowing where we haven't plowed before?

Governor SCOTT. Yes, sir. You have expressed my sentiments very clearly. I think all of us are proud of the accomplishments of our space program and the men who participated. We have a great national pride in this, and I think we look forward to further exploration of the universe, but I think we must be conscious that all of our frontiers here at home have not been fully explored and this is what I was referring to a moment ago about the State of North Carolina coming to realize that we have an unexplored frontier right with us and it is something that is tangible to us, is right there, and we have the potential and we want to get on with developing this resource that will benefit the population here in the United States and in the world, as I see it.

Mr. PELLY. Well, I would certainly like you to know that our chairman has patiently and persistently worked and tried to get legislation and get as far as we are today. It has been a great pleasure for me to work with him. It wasn't easy because we didn't always have those in the executive branch that agreed with the approach of the legislative branch, and we didn't have any unity between the other body and ourselves at the time, but Mr. Lennon has really done a yeoman job in carrying this forward. I am sure you know of that, but I think you should know that some of us who work with him appreciate him and his very fine work and respect and admire him and enjoy working with him.

We certainly appreciate the fact that you have come here today and made this very fine statement. Thank you.

Mr. LENNON. Thank you, Mr. Pelly.

Mr. Downing.

Mr. DOWNING. Senator Scott, it is a real honor to have you before our subcommittee today. I hope by now you know how much we appreciate North Carolina's contribution in Alton Lennon. He has done a terrific job in bringing this thing to fruition.

As a neighbor of yours I have witnessed your progress and, believe me, it has been great. I remember when I was a young boy I used to say about North Carolina there were two classes of people there, dead rich and dead poor.

Mr. LENNON. Are we still on the record?

Mr. DOWNING. But now, through some great Governors, you, Terry Sanford, you have really got North Carolina going.

I am interested in this council that you formed. You have marine science outlets in North Carolina, but in addition to that you formed the Governor's Council on Marine Sciences. Tell us a little bit about that and a little bit more about the purpose of this council.

Governor SCOTT. This council is composed of private citizens who are interested in the development of our marine science potential, and it is primarily a coordinating agency to bring together all of the activities going on in the State-supported and privately-supported endeavors in order that our thrust might be of the same general direction.

The council, itself, does not have any great authority in terms of what it can say to any specific agency, "You can or cannot do this." But it is more or less a coordinating agency and just that, a council where the views of these various institutions and the programs that are going on can be expressed hopefully to prevent a lot of duplication and any potential conflicts that might arise.

Mr. DOWNING. How many people are on this council?

Governor SCOTT. Twenty-one.

Mr. DOWNING. Are they paid?

Governor SCOTT. No, sir; they are not. We have an executive director.

Mr. DOWNING. How often do they meet?

Mr. JONES. There is no set time at this point in time of the activities. The council and the technical committee that has been serving with it to date have been more or less devoting themselves to putting together a statewide long-range plan for the development of marine sciences and marine resources. We meet when we have had enough planning to call the council together to advise with them and advise the Governor.

Governor SCOTT. This is Mr. Walton Jones, who is the executive director of the council.

Mr. DOWNING. That is most interesting. When and if the coastal zone concept becomes law, would you need this council then?

Governor SCOTT. I think it would depend upon how the coastal zone, itself, was established and its makeup and the governing body. It could very well be that the council, itself, would be absorbed into the governing body of the coastal zone.

Again recognizing that the marine sciences program going on in North Carolina involves both private and State sectors and it involves, of course, research in our institutions of higher learning, it involves both basic and applied research, it involves the coordination with the sea grants program and all of this, unless the coastal zone would incorporate the type of coordination that we anticipate having under this council, then I would think that maybe there would be a place for the council to continue particularly in the development of long-range plans and what it is we hope to accomplish.

Mr. DOWNING. The Council has no authority; does it?

Governor SCOTT. It has no real teeth in it; no. It is a planning and coordination agency.

Mr. DOWNING. And advisory?

Governor SCOTT. That is correct. May I ask Mr. Jones to comment further on that. He is familiar with it and has been working with it since it was established.

Mr. JONES. Let me say that when you say it has no teeth, it has the teeth to the extent that we can convince the Governor as an advisory body to the Governor that this should be done and then it has the full backing of the Governor, and we have no authority except that we advise the Governor and he says this should be done and then this has a tremendous amount of authority.

Governor SCOTT. That is debatable.

Mr. DOWNING. Is your 21 members somewhat unwieldy, Mr. Jones?

Mr. LENNON. Mr. Jones, will you come up next to the Governor and then you may have the use of the microphone. I didn't mean for you to leave. I meant just bring up another chair and shift the mike between you. Thank you, gentlemen.

Mr. DOWNING. Do you find that rather large number to be unwieldy?

Mr. JONES. No, sir. This is not really a problem in that we break ourselves down into subcommittees and task forces to work on specific aspects of the problem and then we bring it back before the full council and get their reflection and their study of the recommendations of these task forces.

Mr. DOWNING. And this council I suppose could coordinate the Federal legislation with State legislation and so forth?

Mr. JONES. Yes, sir. Our objective here is to put it all together into one package so that no one is working in conflict with another, that we allocate functions among institutions and agencies so that they complement rather than to contradict, and this is the function of it.

I might say that we have a technical committee that works along there with the council at the present time because this is a technical area and many of these people on the council have a genuine interest and are people with analytical minds that can make judgments as to whether it is good or bad, but we do need people like John Lyman, who is an oceanographer and the man who can really get down to the science matters of it.

Mr. DOWNING. How much money did North Carolina appropriate to establish this council?

Mr. JONES. It didn't necessarily appropriate any money to establish the agency. What it did was to appropriate money to support and back up the plans of the council that, in turn, would give support to the institutions that are being tied in through this council to carry forward with their plans and programs that the council is helping them to put together.

A lot of this money, the \$1.8 million that was referred to, would be money that would back up the Office of Sea Grants, the programs we might get through them, the Coastal Plains Commission's program. It would match the contribution that we hope that we would get from the Federal Government to carry out the plans that the council is putting together.

Mr. DOWNING. I think it is an excellent idea. Thank you very much. Thank you very much, Governor.

Mr. LENNON. Mr. Schadeberg.

Mr. SCHADEBERG. Governor Scott, I have no questions, but would like to state that it looks very much like you have rolled up your sleeves and gone to work. I want to thank you for your testimony.

Mr. LENNON. Thank you.

Mr. Karth?

Mr. KARTH. Thank you, Mr. Chairman.

I want to join my colleagues, Governor, in extending a welcome to you here before the committee. I must confess that Minnesota, being as landlocked as we are and not having the benefits of such a coastal zone as you have, undoubtedly has not contributed nearly as much as your great State through you and your predecessors and the members

of this committee, including the distinguished chairman of the subcommittee.

But, nonetheless, it does not indicate a lack of interest in the importance of the marine sciences and oceanology and marine resources.

I want to extend my thanks to you for a very able contribution. Thank you very much.

Mr. LENNON. Thank you, Mr. Karth.

Mr. Ruppe?

Mr. RUPPE. Thank you, Mr. Chairman.

I have no questions, Governor Scott, but I certainly would like to commend you on a very excellent report. It is rather obvious that your State has done everything possible to assure future study and utilization of the ocean resources in your State and I trust that we on the Federal side do as well in forthcoming years.

Thank you.

Mr. LENNON. Thank you.

Mr. Jones?

Mr. JONES. Thank you, Mr. Chairman.

I just want to commend Governor Scott on what I consider one of the most concise and fine statements of its kind that this committee has received.

Along with the other members of the delegation, as you stated here, as a North Carolinian I am extremely proud of what you have done, and I am convinced that under your leadership we will accomplish much in the next three years.

Mr. LENNON. Mr. Chairman, do you have questions?

Mr. GARMATZ. No questions. I don't like to be repetitious, but surely I must join my colleagues in commending you, Governor, for the excellent statement and especially for the keen interest that your State and you as Governor have shown in this overall program.

The fact that your assembly has appropriated \$1.8 million for this and also \$500,000 for the purchase of estuarine lands shows that you do have what we might call real local interest in the legislative bodies there.

Surely that is a good sign when you can get your local assemblies to cooperate and get money out of them. I think that is great progress, and I personally want to congratulate you for an excellent and fine job.

Governor SCOTT. Thank you, sir.

Mr. LENNON. Thank you.

Gentlemen, I want to ask unanimous consent that the gentleman from North Carolina who represents a great deal of the coastline in his district may speak.

Do you have questions?

Mr. HENDERSON. I have no questions, but I want to make two points that I think would be helpful for the record.

I want to commend you, Governor, for a very fine statement. In your statement you pointed out what the State of North Carolina is doing by way of commitment to legislation and by way of appropriations. I would like to think that the people of North Carolina would recognize that the commitment of the State of North Carolina to spend some State tax funds will be of great benefit not only to our State but to the entire Nation. Perhaps with the new taxes that the State legislature found it appropriate to levy, our people will recog-

nize that certainly in this area we can expect great public benefit to be derived from the expenditures of those taxes in the future.

Secondly, as a member of the House Public Works Committee, I certainly would feel remiss if I didn't point out that the chairman of that committee, Mr. Fallon of Maryland, who is a very close friend of the chairman of this committee, is tremendously interested in this entire area because the jurisdiction of that committee is also very much concerned with coastal problems.

Some of the conflicts that you talked about with regard to dredging, flood control, navigation, and so on, will fit into the problems that are in the jurisdiction of this full committee and the subcommittee.

I think that it would be well to recognize that Chairman Fallon and Chairman Garmatz, both from the great State of Maryland, certainly are performing a great service in trying to improve and develop the marine resources and the water resources of our Nation and as a member of the Public Works Committee, Mr. Chairman I wanted to recognize that the chairman of your full committee, as well as Chairman Fallon of the Public Works Committee, have contributed much to the State of North Carolina and to the Nation.

I am delighted to have had an opportunity to sit here this morning.

MR. LENNON. Thank you, Mr. Henderson.

Yesterday we had the pleasure of having Senator Claiborne Pell as one of the witnesses before the subcommittee. He made this statement, with which I find myself in total agreement.

In speaking of the sensational landing of human beings on the surface of the moon, he made this statement :

While detracting not in the least from our building of pyramids in space.

And he was there referring to a recent article by Mr. Drucker, he goes on to say—

I believe our national oceanologic program has far greater potential for enriching the life of man here on earth.

Then he goes on to quote Mr. Drucker's statement in his article :

... we are about to tackle systematically the development of the oceans as the greatest economic resource to be found on this earth.

I don't see how any fair, reasonably informed, and knowledgeable person can disagree with those two basic statements. I think they are part of our future.

Governor, you have stressed, and I think appropriately so, in the light of your own experience and in the light of the formation by your predecessor of the State Marine Sciences Council and the subsequent recommendation of yours which resulted in its being statutorily formed and based, and I certainly agree with that, the need for legislation that would implement that part of the Commission's report related to the coastal zones and laboratories.

I would like at this time to ask the gentlemen of the committee to go back and review again, if you will, since all of you have copies of the Commission's report in your respective offices, pages 56 through 60 of the Commission's report. Then I am going to ask counsel to confer with the legislative draftsmen and to try to develop a separate piece of legislation that would include the Commission's recommendation with respect to this part of the report that I have just noted, pages 56 to 60, speaking of the Coastal Management Act.

I may take the liberty, and I want you gentlemen to participate in it if you like, to introduce that legislation for which there is no commitment on anyone's part except to use it as a vehicle for our coming hearings.

We have, as you gentlemen know, and all of you participated in its sponsorship, the legislation which from here on out will be considered as well as the Commission's report by the witnesses who appear in the future, but it occurs to me that when we get into the September hearings, at which time we expect to have the various agencies and departments and bureaus of the Federal Government who might be affected by this particular legislation, it might be well to have a vehicle here related to the coastal management recommendations made by the Commission for which they might be called on to testify.

I will ask counsel to do that and try to have by Tuesday of next week, draft legislation that would in substance be a forward step in the consideration of the implementation of this part of the Commission's report.

Now, there are other recommendations that Governor Scott placed emphasis upon in addition to that.

Governor, would you refresh my memory quickly about the other specific recommendations that you had in addition to the question of the coastal zones, the coastal management? I think you had one other that you laid some stress upon in your statement.

Governor SCOTT. Yes, Mr. Chairman.

I was looking for the exact statement.

Mr. LENNON. Is that coastal zone laboratories?

Governor SCOTT. The coastal zone laboratories; in addition to the coastal zone authority, the establishment of the laboratory, itself, which, of course, would necessitate some funding. These are the two priority items that we are concerned with.

Again, as I stated, feeling that any question of reorganization might properly come later, we think the urgency of getting on with the actual development of these resources can be met within the existing framework and later on if it is determined that the program can best be operated under a separate agency or another coordinating council, it can be done.

Mr. LENNON. In connection with that recommendation, I would like to suggest, too, that counsel review that part of the Commission's report relating to its suggestion or recommendation for the establishment of the coastal laboratory. I am of the opinion that in a piece of legislation that will be used for consideration only by the committee that perhaps there should be one single piece of legislation.

That doesn't commit us at all, gentlemen. If someone gives us a vehicle to base the testimony on, it will remind us to ask questions of the witnesses who appear in the future not only on the legislation we now have pending before us but on this legislation as well.

I think it is interesting, Governor Scott, that you called our attention rather dramatically to the position of the administration that took place back shortly after the first report came out, not from this committee, but from an independent committee, and the experience this committee had with the so-called Interagency Committee on Oceanography.

We found much to our surprise in our hearings that the agencies and departments which had a role and mission in the marine sciences did not participate as members of this Interagency Committee on Oceanography.

So we stopped the proceedings long enough to request that that particular agency come before the committee and explain why it was not invited to put a person from that agency on the Interagency Committee on Oceanography. We went through that sort of traumatic experience over a period of time.

Now, coming back specifically to the Commission's report with respect to, number one, the establishment of a Government structure, in the hearings in 1965 and in 1966 which lasted over an extended period of time, we found a wide variety of views and recommendations made to the committee.

We had strong recommendations from a number of members of Congress on the wet NASA. We had other people who bitterly opposed it. So that is the reason why in the drafting of the legislation which resulted in the Presidential Commission and also in the national council we mandated in that legislation the Commission to make a study in depth and recommend to the Congress, number one, if there should be a new central government structure and, number two, if they did make such a recommendation, the type of structure and what agencies would be involved.

In our communication to the President in consideration of the appointment of the Commission, we urged him not only to get the people for that Commission who had the background in science and technology related to oceanology and oceanography and all the marine sciences, but to get the men for that Commission who could give the time, and those of use who were privileged to serve, Congressman Mosher and myself, as the congressional advisers to the Commission, think they did a magnificent job.

We were privileged to meet with them on many occasions, not to in any way influence them with regard to the type of report that they ultimately submitted to the President and the Congress, but simply to advise them in what we understood the congressional intent to be, we having been the two members of the committee that were present at all of the hearings, Congressman Mosher and myself, having been on the conference committee to write the conference report and the subsequent legislation that was adopted both by the Senate and the House, and also to attempt to interpret for the members of the Commission the congressional intent as reflected in the debate both on the House floor and the Senate floor.

I do believe that it is the consensus of the preponderant majority of the members of the Commission that we ought to move in the direction that you have laid stress upon, and I think it is evidenced by the fact all 20 members of the subcommittee joined in sponsorship along with the chairman of the full committee.

I think you would be interested, Governor, in knowing that while most of our witnesses have been from the private sector of our economy as well as the university and in the private laboratory sector, there has been a unanimity of agreement among all of our witnesses that we ought to create the national advisory committee.

I am not talking about the Government structure. There was no

difference among any of the witnesses. There was some difference with respect to the Government structure, but not enough to give us any great concern. You put your finger on it when you said that agencies, departments, and bureaus which have substantial operational functions within those agencies which are engaged in the marine sciences, whatever type it may be, look with a little bit of disdain upon giving up any meaningful part of their governmental structure. We recognize this.

Frankly, we had hoped that by mid-June, we were almost assured that by mid-June, the administration witnesses would be ready to testify, but they have asked that their time be extended to September, and we are going to conform to their request.

Now if you or anyone who is here from North Carolina, your staff or associates, would like to add anything to what you said, we would be delighted to hear from you now or, if either you, Governor Scott, or anyone here from North Carolina would like to add a supplemental statement to what you have said or answer any questions more in detail that may have been raised, the record will be kept open for a reasonable period of time for that purpose.

Mr. Garmatz?

Mr. GARMATZ. If the gentleman will permit, I was interested in the statement that Senator Pell made yesterday and you mentioned part of it. If I may read part of his statement for the Governor, he goes on to say:

Mr. Chairman, we in the Congress are considering this report in the midst of a renewed public interest and enthusiasm in the exploration of outer space, prompted by the dazzling success of the Apollo mission. I, too, have been deeply impressed, even awed, at this magnificent achievement.

I would not venture to enter the competition in seeking for appropriate adjectives to describe the first extra-territorial visit by man. I would simply say it is historic.

But I was struck recently by the historic context which the space program was placed by Mr. Peter F. Drucker in his very perceptive book, "The Age of Discontinuity."

Searching for historical precedents, Mr. Drucker recalled that ancient Egypt some 7,000 years ago produced two truly historic achievements—the building of the first pyramid, and the invention of the plow. The building of the pyramid had a profound philosophical impact on man, but the invention of the plow, by increasing agricultural productivity, virtually restructured human society.

And then Mr. Drucker expressed the opinion that in our age, "space exploration is our 'pyramids' and the exploration of the oceans our 'plow'."

That is all, Mr. Chairman.

Mr. LENNON. The reason I didn't do that is because you know Governor Scott comes from long forebearers of agricultural people in Durham, and if I got him into a discussion of what the plow meant to civilization, we would be here for a week.

Mr. GARMATZ. I thank the chairman. Thank you.

Mr. LENNON. We appreciate your appearance here this morning and look forward to seeing you on at least another occasion this evening.

Mr. GARMATZ. I also wish to tell the Governor that we have two other staff members from the great State of North Carolina, Mr. Winfield who has been with us for almost 18 years, and Mr. Ned Everett who was here just a moment ago who is counsel for the Subcommittee on Fisheries and Wildlife Conservation.

I want to say that they are doing an excellent job on the overall committee.

Mr. LENNON. The gentleman is suggesting that North Carolina is pretty well represented on this committee and on the staff.

Mr. GARMATZ. A little more so than Maryland.

Mr. LENNON. Thank you, gentlemen.

Governor SCOTT. Thank you, Mr. Chairman, for allowing us to participate.

Mr. LENNON. It was our great pleasure.

Our next witness is Dr. LeVan Griffis, who is the vice provost of Southern Methodist University, and chairman, Panel on Research, Education and Information Dissemination, Committee on Ocean Engineering, National Academy of Engineering.

Doctor, if you and your associate will come forward and have a seat at the witness table, we will look forward to hearing from you, sir.

I ask unanimous consent that immediately preceding Dr. Griffis' statement that there be inserted in the record at this point a biographical sketch and résumé of his splendid activities in the field which he speaks to this morning.

(The biographical sketch and résumé follows:)

DR. LEVAN GRIFFIS

LeVan Griffis obtained BS (1937), MS (1938), and Ph. D. (1941) degrees in engineering from the California Institute of Technology. He became professor and chairman of engineering mechanics at the Illinois Institute of Technology (1945) and directed the mechanics research division, Armour Research Foundation in Chicago until 1953. After serving as director of American Machine and Foundry's Chicago research division, he accepted the post of manager and director of the Borg-Warner Corporation Research Center, which post he held until 1959. He became the first dean of engineering at Rice University (1959-1963) and then accepted the position of vice-president, Southwest Research Institute, Houston. Joining the staff at Southern Methodist University in 1965, as professor of engineering and director of grants and contracts, he became vice provost in 1967, which position he now holds.

He serves presently as a director, LTV ElectroSystems, Inc.; advisor to Southeastern Drilling, Inc.; chairman of the panel on Research, Education and Information Dissemination for the National Academy of Engineering Committee on Ocean Engineering; member of the Advisory Panel for Sea Grant Institutional Support; member of the Naval Research Advisory Committee's Laboratory Advisory Board for Naval Ships. He was a member of OEC Mission 84 to Austria for R & D in 1962; advisor to the Ship Structures Committee and to the Committee on Ship Steel of NAS-NRC for preparation of monographs in "Brittle Fracture of Engineering Materials"; and on "Residual Stress"; a director of Reed Roller Bit Co., Houston; and a director of LTV, Inc.

A registered professional engineer in Illinois and Texas, he is a member of American Society for Engineering Education, Tau Beta Pi, Sigma Xi, and Society for Experimental Stress Analysis.

STATEMENT OF DR. LEVAN GRIFFIS, VICE PROVOST OF SOUTHERN METHODIST UNIVERSITY, DALLAS, TEX., AND CHAIRMAN, PANEL ON RESEARCH, EDUCATION, AND INFORMATION DISSEMINATION, COMMITTEE ON OCEAN ENGINEERING, NATIONAL ACADEMY OF ENGINEERING; ACCOMPANIED BY DR. RUSSELL KEIM, EXECUTIVE SECRETARY, COMMITTEE ON OCEAN ENGINEERING, NATIONAL ACADEMY OF ENGINEERING

Dr. GRIFFIS. Thank you, Mr. Chairman and members of the Subcommittee on Oceanography.

Let me take this opportunity to present Dr. Russell Keim, the Ex-

ecutive Secretary of the National Academy of Engineering Committee on Ocean Engineering. Dr. Keim is sitting on my left.

It is a privilege to appear before this committee to express my views on the report "Our Nation and the Sea" by the Commission on Marine Science, Engineering, and Resources. My interest in our national commitment arises because of my responsibilities as vice provost of Southern Methodist University, and also as chairman of the Panel on Education, Research, and Information Dissemination of the National Academy of Engineering Committee on Ocean Engineering.

In the latter capacity, I am preparing a detailed presentation on these three topics, as part of the engineering report of that committee, to the academy. In addition, as a member of the Advisory Panel for Sea Grant Institutional Support, I am mindful of the opportunities for educational and research related to the oceans which Sea Grant programs envisions. And as a member of the Naval Research Advisory Committee's Laboratory Advisory Board for Naval Ships, I see the effect of mission requirements in shaping policy for support of research and education by U.S. Government agencies.

My presentation is as an individual concerned about the position of the United States in regard to its potential exploitation of the seas. My remarks do not necessarily reflect the position of Southern Methodist University, the National Academy of Engineering, the National Science Foundation, or the Naval Research Advisory Committee.

The commission's report "Our Nation and the Sea" is one of the most comprehensive documents ever prepared on the importance of our national posture relative to the world ocean. I concur in the national marine program recommended in the report as a major contribution to national planning, and believe that sufficient national engineering and scientific requirements are included in that program to make it very effective. I support the conclusion that there is a need within the U.S. Government for a reorganization in marine affairs.

The commission recommendation for the establishment of a National Oceanographic and Atmospheric Agency (NOAA) and an associated advisory group (NACO) is one possible and useful method for implementing the Government's current functions in the marine environment, which will, in addition, strengthen its activity in other appropriate marine functions, as well as supplement a national marine program.

In the case of my specific interests, this proposed coordination of Government activity seems to be a very effective way in which to supplement a national effort to improve long-range engineering development and our fundamental technology in the ocean, and to assess and maintain the Nation's research and manpower needs for support of a national marine commitment.

More specifically, it seems to me that the following major recommendations of the commission outline a framework of national goals required for effective monitoring, controlling, and utilizing of the ocean :

- (1) To establish increased understanding of the oceans as a major goal (page 23) ;
- (2) To establish university-national laboratories (page 27) ;
- (3) To undertake a comprehensive fundamental technology program (page 27) ;

- (4) To establish coastal zone laboratories (page 29);
- (5) To establish national projects (page 37); and
- (6) To expand the Sea Grant Program (page 44).

SOME SPECIFIC ISSUES REQUIRING RESOLUTION FOR IMPLEMENTATION OF BROAD NATIONAL OCEAN GOALS

Within the framework outlined by these recommendations there are activities and procedures that will require a great deal of innovation especially at the interfaces among universities, government, and industry. Many alterations in our programs of research, education, and information dissemination will be required; and the following comments are submitted to clarify some of the problems and to delineate some of the issues which may be important in this process.

ENGINEERING RESEARCH AND LONG-RANGE ENGINEERING DEVELOPMENT— UNIVERSITY, GOVERNMENT, INDUSTRY

Let me first turn to some of the problems at the interface between university and Government in the pursuit of the university's educational and research function relative to the oceans.

One important group of problems arises from the growing requirement for cost-sharing with nonfederal funds—"matching funds" as they are usually called. The concept of cost sharing is opposed in many academic quarters as a device to generate further taxes for implementing a policy established by Congress in support of education and research.

On the other hand, the concept is often justified by the belief that these programs are of sufficient importance to the institution that they would be carried out, at least in part by the institution even in the absence of Federal support. Whatever one's point of view, it appears that the cost-sharing requirement provides the logical justification to enlist support from the other necessary partner in this utilization of the seas—namely private industry which can benefit from the ocean-related program. There seems to be some problem, however, in enlisting this source of support.

Another problem related to cost sharing is the establishment of the proper and clear definition of scope for which the agency sponsor is providing a contractual commitment. Is it the total program scope, including that funded by the matching funds, or is it only the scope funded by the agency? And if the institution is already pursuing related work under its own funding, is the cost of this segment of the total program scope eligible to be counted as matching funds?

Equally important is the question of what privileges, what prerogatives, and what authority over the total program does the party hold which provides the matching funds? Should he not have a proportionate share of responsibility for determining project scope, and for evaluating program progress and quality, and for sharing in the patent rights?

Another concern is the matter of maintaining quality of performance and of project effectiveness in programs of long duration which have been promised stability and financial continuity over several years. Institutions cherish and even demand this funding stability, but are not always able or willing to provide full accountability for the

use of funds. Operational review procedures, compatible with the academic environment, are required to a greater extent than heretofore and must be encouraged.

In making a commitment to provide educational facilities and to conduct research aimed at utilization of research results, at development of techniques, and at design of equipment applicable to development of resources, a university sometimes finds itself unable to complete the transfer to an appropriately competent industry, or it finds its faculty unwilling to make the transfer as soon as it should be made. Greatly improved management methods need to be developed to improve the success of this transfer process, or to avoid making the commitment in the first place if, indeed, it is not to be fulfilled. The entire process relating engineering (or mission related) research to economic development is one deserving great attention.

Over the past decades, a highly effective means of communication has been developed between sponsoring agencies and the administrative and academic personnel in educational institutions. It is not so clear that an equally effective mode of communication exists between the Federal agencies and the policymaking bodies of our educational institutions. In many cases, these policy bodies are composed of representatives of industry and business who should be as close to the sponsoring agency as the faculty, but who often are not.

At a time when national policy is being made affecting the ability of educational institutions to meet new national goals, and which policy should include the private sector as a partner in the enterprise, it would seem that new and radically improved communications need to be established among the policymaking bodies—the boards of trustees of educational institutions and the Federal agencies.

Again, over the past decades, grant and contracting arrangements have been developed whereby the great majority of engineering and scientific talents within universities have been made available to further the national engineering scientific goals.

An additional reservoir of engineering and scientific talent exists within our industrial research laboratories which can cooperate with, and supplement, and increase the research output performed by the university sector, especially in applied research. Some of this cooperation exists now, although there is frequently a more competitive than cooperative feeling between industrial and university laboratories. This suggests that new policy and a new framework for joint industry-university research might be developed, that new methods of grant and contract participation by industry might be encouraged by the Congress, in order to stimulate more cooperative relations between industry and university activities. I believe that the prime grantee (or contractor) responsibility should occasionally be placed within suitably chosen industrial laboratories, where this action can be expected to speed up the process of technology transfer.

In reviewing the broad institutional proposals submitted by universities under the encouragement of the present sea grant program, the engineering elements and technological scope within these proposals sometimes appear lacking in imagination, in definiteness of objectives, in realism of techniques, and in realism of costing to produce anticipated results, compared to the scientific components of these proposals.

This problem seems to me to be general enough, and to be evident even at outstanding institutions, to warrant investigation to determine whether it is related to institutional salary policy, to the outdating of curriculum and of faculty competence, to excessive teaching loads, perhaps to inadequate motivation from the sponsor, to the national policy framework or some other.

The resolution of these questions is a matter of concern for the Congress as well as the sea grant program. Cost sharing, contract definition, motivation of industry to become a partner with universities, quality control in education and research, effective use of research for economic growth, communication with university policymakers, the utilization of industrial research and educational talents—all these matters—represent problems whose solutions have their roots in the legislative objectives for the support of higher education. Such objectives would take into account how to provide the resources for educational institutions in meeting first the goals of education and then the goals of mission-oriented agencies. The investigation and resolution of these issues will be essential to the realistic implementation of the broad national ocean goals.

It is a conservative statement that realistic funding of the sea grant program must be provided before the goals of the sea grant legislation can be achieved. The goals of the sea grant program are excellently conceived in general to provide a flexible master plan for engineering, scientific, and related education and research in ocean-related disciplines. I urge that this program be implemented with adequate funding.

ENGINEERING MANPOWER EDUCATION

A few remarks seem to be in order concerning manpower planning for the oceans and its relationship to university functions.

The universities presently stand at the interface where graduate engineers and scientists move out into industry, where research results become available to industry and to government, and where continuing education can be joined with industry to serve the needs of updating the professional engineering, technical, and scientific capability.

At the same time, university administration is under criticism in some areas; research—especially applied research—is similarly under attack. Faculty are reproached for their real or imagined “flight from teaching.” University financial matters are generally a cause for grave concern.

It may be noted that the number of university students entering engineering has remained approximately constant for over 10 years; and engineering graduates—the key to technology utilization—have numbered about 35,000 per year for the same period of time.

During the near future, when the Nation initiates a large new technological program, aimed at the oceans, it is important that new projects, new curriculums, new facilities provide a motivation which helps—not hinders—the national growth of the university and especially of graduate education.

We must be careful not to expect too much of universities, and to insure that the concept of university-national laboratories does not become a base for campus disorders, for disparate geographical Federal

research and development support, for further "flight from teaching," for for other ills often ascribed to mission-oriented university activity.

In order to avoid such pitfalls, means must be devised to relegate the initiative for utilization of research results to specially equipped institutes or to applied research centers. The responsibility of industry to share the cost and effort in this program by new cooperative arrangements should be established and motivated.

In summary, the encouragement of students and graduates to enter ocean-related fields should come from the excitement and from the motivation of expanding the horizon of land-based science, engineering, and technical specialties into the marine environment and not from establishing new areas of glamor or superficiality.

Engineering information dissemination: Let me comment briefly on the subject of ocean engineering information centers. In studying the requirements for information dissemination related to the oceans, it seems desirable to distinguish clearly between the process of data management and the problem of disseminating engineering information. The former is receiving major study and support; the latter problem is not so clearly understood and may need special identification concerning its value.

Dissemination of engineering information implies engineering analysis or design procedures, the compilation of handbooks or design manuals, the conduct of engineering studies, and consulting engineering activities. It connotes data interpretation and the application of resulting information to timely solution of engineering problems. A few organizations exist which specialize in this type of activity on a national scale. It is believed that such a function should be assured as part of the growing national activity for utilizing the ocean.

Generally speaking, the effective management and operation of any of these existing engineering information centers seem to depend upon three broad requirements:

(a) A cadre of professional engineering personnel working as experts in the appropriate fields, either in design or research, all qualified to select and interpret data, to apply these data to engineering problems, and communicate effectively;

(b) Continuous and stable funding of the information enterprise, independent of the user's ability to pay; and

(c) Management and administration of the activity by a non-governmental entity under contract to Government and/or industry groups.

This third element seems essential to maintain objectivity and to avoid problems of proprietary interest.

I suggest that an initial center related to the oceans should cover the field of ocean materials information, based upon the history and success of the Defense Metals Information Center maintained at Battelle Memorial Institute. Other pertinent subject areas might be developed later for successive ocean information centers, following in-depth studies, and as the requirements of the national program of ocean exploitation might dictate.

It is further recommended that a study be made concerning the establishment of a confederation of ocean engineering information centers, and that responsibility for the Government participation in

these centers should rest with the organizational structure proposed by the Commission.

A few engineering-related subject areas which might be recommended for such centers in the confederation are as follows:

- (1) Ocean materials information.
- (2) Coastal engineering and Great Lakes physical information.
- (3) Oceanographic and meteorological information.
- (4) Soil mechanics, bottom sediments, and foundations information.
- (5) Seismological and geophysical information.
- (6) And design information for ocean platforms, structures, and vehicles.

In the dissemination of engineering information, there arises a problem in the security classification of information during its development or use. Current policies, procedures, and the specific actions by both executive and legislative branches of Government on the releasing or withholding of information, are confusing and seen at times to be excessively restrictive.

This confusion causes a hinderance to university and industrial participation in important research. It is suggested that, in developing systems for information dissemination related to the oceans, a study be made of ways to optimize information dissemination to speed up the processes of appropriate declassification, and to expedite useful distribution of engineering knowledge.

An example will serve to illustrate this problem. Today data are not readily available to the offshore petroleum industry, concerning underwater explosion parameters usable in controlling underwater oil production. Such parametric data were developed as early as 1943, these reports have since been declassified, and are of little or no security value, but this information is as yet not easily obtainable through civilian channels.

In conclusion I shall summarize and emphasize my major points:

I concur with the conclusion of the Marine Commission and others who have investigated this subject in depth, that it is essential for the United States to be committed to the ocean as an important element among our national interests and commitments.

The effectiveness of the Government participation in fulfilling this commitment is related to the programs, to the organization, and to procedures that are to be established. Recognizing the need for some reorganization in marine affairs in the U.S. Government, I have outlined briefly a few of the essential aspects of engineering research, information dissemination, and manpower education that I believe require consideration in the development of effective marine programs, organization, and procedures.

The concentration of my presentation on these specific subject areas does not imply that they are the sole or primary functions of Government in marine activity. Any reorganization of the U.S. Government should not overemphasize the requirement for long-range engineering development and research to the detriment of other direct functional requirements such as aids to navigation, resource management, and defense.

Please note that, as an engineer, I strongly urge that, even though the Government and national interests, as they should, are shifting toward engineering and marine resource utilization, the support of

nonmission-related research by the scientific community be adequately supported. The engineering community, which is always involved with mission-related activity, recognizes that the support of basic science is an essential cost if we are to continue to have technological development.

In the development of our marine economy by means of engineering and other mission-related research and development in the universities, it is important to recognize the essential joint responsibility among Government, industry, and universities for the support of this engineering research. This implies that the benefits must be mutually shared. There is a serious deficiency in understanding of the mechanisms by which the results of engineering investigations in universities may be quickly utilized for accelerating economic growth.

For the accelerated growth of a technologically oriented area such as marine resources, it is necessary to develop and make available an information dissemination capability in support of engineering design and management. This capability should be developed to assist closely, but not to compete with, the consulting engineering function. It is qualitatively different from, and is complementary to, the management of data appropriate for the support of scientific research.

With regard to engineering manpower education, I have suggested that there are major problems evident in the trends of engineering education and its relation to the economy. With the anticipated acceleration in the marine field, there is an opportunity to capitalize on these educational trends. There is a threefold opportunity—for Congress, for industry, and for universities: First, to strength the educational institutions in which heavy support is being invested, by improving the policies governing this support; second, to develop stronger and more meaningful relations between industry and the universities by motivating cooperative research wherein each partner contributes his best and most appropriate ability and resources; and third, to develop better and more rapid methods for technological transfer of research results into the economy.

It is an opportunity to provide leadership in promoting a more beneficial relationship among the engineer's education, graduate research, and university support by Government and industry, with attendant benefits in economic growth.

These points that I have briefly outlined I believe should be investigated in more detail as organizational and procedural plans are developed for implementing a national ocean policy.

Mr. LENNON. Thank you, Doctor.

Now, does your associate have any statement that he wishes to make at this time or to place in the record at this time?

Dr. GRIFFIS. I believe he does not.

Mr. LENNON. Thank you, Doctor, very much.

The gentleman from Washington.

Mr. PELLY. Mr. Chairman, I want to thank Dr. Griffis for a very fine statement. I have no questions.

Mr. LENNON. Mr. Schadeberg.

Mr. SCHADEBERG. Mr. Chairman, I have no questions either. I would have to study this a little more. There is a great deal in it. I appreciate the doctor coming to testify.

Mr. LENNON. It is very obvious to me, Doctor, that your statement

is going to have to be studied in depth, and I want to ask the counsel to do that and to try to bring back to the committee at some subsequent meeting a definitive explanation, you being an engineer and we being laymen, to counsel and advise us as to the direction that you want us to go here.

On page 6 you say that :

The resolution of these questions is a matter of concern for the Sea Grant program: cost-sharing, contract definition, motivation of industry to become a partner with universities, quality control in education and research, effective use of research for economic growth, communication with university policy makers, utilization of industrial research and educational talents.

This next sentence I want you to talk about :

The investigation and resolution of these issues is essential to the realistic implementation of the broad national ocean goals.

I want the counsel to take that paragraph and take that last sentence and see if we can relate that to what our responsibility is.

I think you recognize, sir, that in the field of legislation the legislation is usually broad. If we implement the commission's report in its entirety through legislation some of the things that you are talking about here, I believe a good part of what you are addressing yourself to here, will ultimately have to be resolved by the agency assuming that it is a Government structure and particularly by the National Advisory Committee if we implement the commission's report in creating this National Advisory Committee.

Is that a fair summary of the situation that I have just laid out, sir?

DR. GRIFFIS. Mr. Chairman, this is a very precise understanding of the points which have been emphasized in this brief presentation. Let me comment that I see the successful implementation of a national program perhaps in three levels or phases of effort.

There is an initial, current phase—let me call it intuitive, for lack of a better word—intuitive understanding of the direction (not entirely intuitive but based on experience and board philosophy as to the direction) of reorganization that we ought to take in implementing such a major national program.

Second, there is the phase of operational planning which needs to be anticipated before the final organizational pattern is put into concrete, let us say, in order to build on past experience and past evolution of effectiveness of interfacing Government, industry and education to achieve national goals. Third, there is the implementation in detail, the administration, and the details of operation, the spending of the dollars, the problem solving.

At the present state of legislation we are at this initial time when intuition, when experience is being judged, when broad philosophies are being set up in the form of concepts and objectives for reorganization.

I am attempting to suggest that we are aware of the evolution that has taken place, let us say, since the time of World War II in the successful nuclear energy activities which have become a national program, with the consequent interfacing of Government and industry and education, including all aspects of education. We have had another amazingly successful program interfacing Government and education and industry in the space program.

We are preparing now to embark on an equally great and important program, the program involving utilization of the oceans. We should not just start in without assessing the shortcomings of these other programs and how we might improve the effectiveness and cut down the time of utilization of results in order that we realize more quickly the investment we shall make in the ocean field.

Assessing these problems, and the relationship to their basis in legislation, should therefore, be given careful consideration in approaching the reorganization which must cope with these problems. These are with us in spite of the remarkable progress that the space program and nuclear energy program have made in utilizing the university community.

Mr. LENNON. Counsel has some questions.

We are delighted to have him.

Mr. CLINGAN. Doctor, just one or two questions for clarification. You have emphasized the problems the universities face in utilizing matching funds. In bringing these problems to the Congress are you suggesting that the problem can only be solved through legislation or are there steps that can be taken administratively or through the Sea Grant program to help alleviate the problems?

Dr. GRIFFIS. I believe the problems will have to be solved both through new legislation and also by administrative action. Part of the solution can undoubtedly come administratively: techniques for project quality control and improved contract definition are pertinent here. A greater opportunity, however, will come from legislation which motivates industry and other organizations in the private sector to participate and invest in research with the universities. This should be especially effective when the results of the research are anticipated to benefit the economy through spinoff or technology transfer. Here, I would expect that new forms of contracting with industry, providing for subcontracts with universities, might be effective. As an educator, I tend to think that many things can be resolved through an educational process some of which may be idealistic. I think nonetheless our experience in going into this problem of cost sharing is both a matter of concern and a matter of great opportunity.

One of the problems of quicker utilization of the results of science, engineering and applied research and the interfacing with the industry, one of the problems is to speed up this process of transfer of applied science into technology and economic utilization. This process involves the relationships between universities and industries. I see this cost-sharing concept as a tremendous opportunity for bringing more closely into this partnership the other member of the partnership, namely industry, in a much larger sense of participation with the universities than they have ever done before. I believe Congress must take some initiative here.

We are seeing a few little experiments being undertaken with the present small sea grant program, but these experiments need to be studied, they need to be encouraged, they need to bring this interface between industry and the universities into a totally new concept.

Mr. CLINGAN. You seem to mention also, if I understand you correctly, that with regard to the matching funds, there is some problem as to what portions of universities resources could properly be considered as a part of the matching funds. Can this be resolved within the existing legislative framework?

Dr. GRIFFIS. I think decisions need to be made and frameworks need to be established within this legislation as to what the ground rules really are. Presently I think there are some shortcomings in the clarification of what these ground rules are regarding the eligibility of certain kinds of cost sharing which might motivate the industry to pick up this part of the burden, and regarding the legal responsibility to which the universities are committed when they accept contracts with a fairly high percentage of non-Federal participation.

Mr. CLINGAN. Thank you, Doctor. That is helpful.

I have just one or two other brief questions. I won't impose on you.

I was interested in your statement on the top of page 8 where you say, "In order to avoid such pitfalls, means must be devised to relegate the initiative for utilization of research results to specially equipped institutes or applied research centers."

Would you expand on that a little for me, please?

Dr. GRIFFIS. The universities are not in a position of being all things to all people although some university administrations would like this to be the posture and image of the university. A university may be able to do certain things much better than other things. In certain geographical localities, for example, universities are very close in their relationships with the accompanying communities, industry, commerce, and the general community.

In other areas this interface is not nearly so intimate.

What I am referring to here is that we not undertake to plan national university laboratories just because universities have a fine image for conducting research, and we therefore assume that they can emphasize and undertake applied research of the sort that this program is going to require. There are some institutions that may be properly qualified or staffed or generally set up within their objectives to accomplish this kind of result.

There are other universities which, if they undertake this, are going to become less effective universities, and, as I have mentioned, bases for campus disorder of various kinds. We have seen examples of this tragically in the last year and this is not a quieted problem by any means yet.

Looking back a little into the history of applied research in the United States, we note that between 1925 and 1950, particularly, there was the creation, the growth, and the prospering of the not-for-profit research institute typified by Battelle Memorial Institute, Armour Research Foundation, and others. Some were associated closely with universities, others were essentially independent and autonomous; most however benefited from some geographical proximity to a major educational institution. Analysis shows that the neutral, fact-finding research and development organization of this type played a major role in the growth of our national scientific and developmental strength, during that quarter century. They were—and many still are—problem-solving, applied research centers, active in the process of "technology transfer" into the private economy. I believe it is possible that a modern organizational unit or concept, somewhat along the lines of these applied research institutes, might be helpful in implementing our program of ocean research and ocean resource utilization. It is not clear, however, that the practical, applied, "spin-off" function toward which we are aiming, is automatically within the central

educational objectives or community service goals of our universities.

Mr. CLINGAN. Thank you, Doctor.

I would finally ask briefly about your confederation of ocean information centers. Is this something that can be done within the existing framework or do you feel that this requires some action on the part of Congress?

Dr. GRIFFIS. The present effective information dissemination centers capable of participating in the field of engineering information are generally scattered within many agencies, some duplicating, and I think some handicapped by the lack of adequate facilities. I believe that a confederation to coordinate the activities of these within a single agency will be most effective in bringing about a total ocean capability.

The volume of information which is arising these days particularly in the last few years and which is bound to expand into the future more rapidly requires that there be less numbers of centers of information and better communication among them so that any one inquiry in a given area can be transmitted throughout a network of information centers and that all the information not be required to be in all of these centers.

Mr. CLINGAN. Am I correct in assuming that this is something that could be worked out among the information centers themselves?

Dr. GRIFFIS. It would be more effective to have a central coordination function in the central national agency if this becomes, indeed, a possibility.

Mr. CLINGAN. Thank you.

Mr. LENNON. Doctor, this is not germane to the subject you are addressing yourself to, but off of the top of your head, do you know in round dollars, and when I say round dollars, how many billions of dollars the Federal Government expends for research in the colleges and universities of this country just in the DOD or the services alone, outside of the many other agencies which have research and development, R. & D. contracts?

Dr. GRIFFIS. \$2 billion; \$2 billion to \$3 billion a year.

Mr. LENNON. That is my recollection of the figure. I wonder what our colleges and universities would do, or what the Government would do if we didn't have these approximately in round figures \$3 billion a year of taxpayers' moneys going into research contracts at the universities and colleges of the country. I think the colleges and universities would suffer and the people would suffer, too. There is no question about it.

Dr. GRIFFIS. Mr. Chairman, you have raised an important question about how essential these funds are, both to the universities and to the Federal Government, and what would they do if these dollars did not go into research contracts at our colleges and universities.

In judging how to reply to this question, I feel constrained to suggest that any answer should include consideration of several basic matters including the following:

1. Is the university the best possible source of competence and project effort which can be enlisted for solving the defense problems under consideration?

2. Is the solution to these defense problems properly compatible with the central objectives of the university?

3. How much of the total flow of dollars reflects actual support of the educational enterprise, and what fraction of the dollars therefore benefits the university in accomplishing its real purpose?

I presume that we are continually seeking to evolve the most effective organizational structures within Government, within industry, and within universities (as well as at their interfaces), in order to get the necessary tasks performed which Government requires, and to provide necessary support for the educational enterprises. How industry may participate more appropriately in these Government-university relationships may, I believe, offer some interesting possibilities which have not yet been explored.

Mr. LENNON. I have been involved for some time in a subcommittee that has gone into this thing rather carefully as it is related to DOD problems and the service problems, and it will shake you up sometimes when you get into it, as the subcommittee of which I am a member has for the last period of time.

I know it concerns all responsible administrators at the college and university level. Doctor, we do appreciate your appearance here today and the statement that you have made. It is obvious to me, as I have indicated before, that this statement is meaningful, it offers a lot of challenge as to which direction we should go.

We certainly do not want to create a Government structure, a national advisory committee, and see the very same things happen that you called our attention to in this statement with respect to the ocean sciences, the marine sciences.

I know that counsel and the members of the committee will be back in touch with you to get your advice and counsel when we get to the draft stage of our hearings.

Thank you very much, sir, for your appearance.

The committee will stand in recess until tomorrow morning at 10 o'clock, when our witness will be Mr. Elmer P. Wheaton, Lockheed Aircraft Corp.

Mr. Wheaton is president of the Marine Technology Society, and chairman of the Panel on Vehicles, Platforms and Equipment of the Committee on Ocean Engineering of the National Academy of Engineering.

Also appearing will be Dr. Francis T. Christy, Jr., of Resources for the Future, Washington, D.C.; chairman of the Economics Committee, Marine Technology Society; and member of the Executive Committee, Law of the Sea Institute, University of Rhode Island.

We look forward to hearing these gentlemen tomorrow.

With that, the committee will stand in recess until tomorrow morning at 10 o'clock.

Thank you very much.

(Whereupon, at 12 noon the committee recessed, to reconvene for further hearing at 10 a.m. Thursday, August 7, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

THURSDAY, AUGUST 7, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY,
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:15 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The committee will come to order.

We are delighted this morning to have as our first witness Mr. Elmer P. Wheaton, who is the vice president of Lockheed Aircraft Corp. and the chairman of the Panel on Vehicles, Platforms and Equipment of the Committee on Ocean Engineering, of the National Academy of Engineering, and also the distinguished president of the Marine Technology Society.

Mr. Wheaton, I will ask unanimous consent to insert in the record your biography just prior to your statement, sir.

(The biographical sketch follows:)

ELMER P. WHEATON

Elmer P. Wheaton, Corporate Vice President and General Manager of the Lockheed Missiles & Space Company's Research & Development Division, joined Lockheed in early 1962. In his present position with Lockheed, he provides direction to a broad range of engineering and scientific activities and to several diversification efforts. He was responsible for the development and operations of the Company's Deep Quest, a research submarine, and for the management of many other advanced programs including the Navy's Deep Submergence Rescue Vehicle and its Deep Submergence Search Vehicle; advanced ground vehicles for the Army; and computerized information systems for government and health care applications.

Prior to joining Lockheed, Mr. Wheaton was Corporate Vice President in charge of all engineering for the Douglas Aircraft Company. While with Douglas he directed the development of the Nike missile systems, Honest John and Genie nuclear rockets, the Saturn S-IVB stage and other advanced aerospace systems. Before and during World War II, he worked on many phases of aircraft programs and associated electronics. In 1943-44 he was promoted to Special Assistant to the Vice President of Engineering and placed in charge of all work contracted to the Douglas Aircraft Company by the National Defense Research Committee and the Office of Scientific Research and Development. Primary programs were the Eagle radar installation and the ROC missile development. Later, Mr. Wheaton was loaned to the Radiation Laboratories of the Massachusetts Institute of Technology where he spent nearly a year as Special Advisor to Dr. Louis N. Ridenour on airborne radar bombing systems.

He is a fellow of the American Institute of Aeronautics and Astronautics, the American Astronautical Society, and The Royal Aeronautical Society. He is a member of the National Academy of Engineering; member of the NAE Committee on Ocean Engineering; and Chairman of the NAE/OE Panel on

Vehicles, Platforms, and Equipment. He is a Patron Member and President of the Marine Technology Society and Councilor to the MTS San Francisco Bay Area Section. He served as consultant to the National Council on Marine Resources and Engineering Development and was a member of the Panel on Ocean Engineering. He also served as a consultant to the President's Commission on Marine Science, Engineering, and Resources. He is a national Director of the American Ordnance Association and a Director of the AOA San Francisco Chapter; a member of the American Association for the Advancement of Science; and a member of the American Oceanic Organization.

Mr. Wheaton graduated from Pomona College, majoring in Physics. He is also a graduate of the Executive Management Program of the UCLA School of Business Administration. He is a registered professional engineer in the state of California.

STATEMENT OF ELMER P. WHEATON, VICE PRESIDENT, LOCKHEED AIRCRAFT CORP.; PRESIDENT, MARINE TECHNOLOGY SOCIETY; AND CHAIRMAN, PANEL ON VEHICLES, PLATFORMS, AND EQUIPMENT, COMMITTEE ON OCEAN ENGINEERING, NATIONAL ACADEMY OF ENGINEERING

Mr. WHEATON. Thank you, sir.

Mr. LENNON. Go right ahead.

Mr. WHEATON. Mr. Chairman and members of the committee: I am delighted to have the opportunity to appear before you today. I hope I can contribute to your deliberations on the report of the Commission on Marine Science, Engineering and Resources and the future commitment of the United States in the marine environment. At the outset, may I point out that I appear here as an individual and that any opinions which I express are my personal views and not necessarily those of Lockheed Aircraft Corporation, the Marine Technology Society, or the National Academy of Engineering Committee on Ocean Engineering. I have given you my biographical sketch.

As one who has been intimately associated with the early development of the aircraft, missiles, space, and ocean fields, I should like to offer an engineer's view of the commission's work. I, too, believe that a major reorganization of marine affairs is required within the U.S. Government.

THE UNDERDEVELOPED RESOURCES OF THE OCEANS

Through its report "Our Nation and the Sea," in addition to its panel reports, the commission performed an excellent service in presenting the problems and promises of the oceans and in proposing a course of action by which we as a nation could reap the benefits of these vast underdeveloped resources.

We have hardly begun to harvest the resources of the seven-tenths of the area of the earth which lies under water. The potential is so great that the future well-being of our Nation may well be at stake if we do not move in this direction.

ROLE OF THE OCEAN ENGINEER

The role of an ocean engineer is to render the marine environment routinely and economically available to mankind. This job is not easy, for the environment is highly corrosive, with frequent storms on the

surface, with a rough and changing sea floor, and, of course, with awesome size, darkness, and depth. The suitability and reliability of marine vehicles, platforms, and equipment will play a crucial part in the operational and economic success of any commercial, scientific, and military ventures of the future. Therefore, the effective use of the sea will depend heavily on the advanced technology which the ocean engineer can and must provide.

ADVANCED TECHNOLOGY DEVELOPMENT

For years our marine scientists have been doing an outstanding job in learning the basic facts about the ocean. However, despite a scattering of outstanding successes in applied marine technology, marine engineering efforts have generally been small and slow in developing. This fact was corroborated by the commission, which found that the Nation did not have a broadly based technological capability to operate throughout the ocean.

Because of our current lack of marine engineering data, it is unfortunately difficult to produce advanced marine systems quickly and economically. The costs of new operational systems have been high because advanced technology, requisite design data, and know-how have had to be developed concurrently with production of the system.

I believe a much sounder approach would be to conduct a continuing program of engineering research independently and to assure that technological advances achieved during prototype development are made available for later use by other designers of marine systems. I would like to present a few specific examples.

Power application is basic to working in the sea. Mechanical and electrical equipment have been developed for operation in the atmosphere or vacuum of space, but the high pressure and corrosiveness of the ocean impose far more severe demands on design than most previous applications. For example, the relatively simple operation of purging fuel cell reactants in space becomes a major design challenge under water. Whether in manned deep submersibles or unmanned ocean work platforms, efficient design requires the use of mechanical and electrical equipment that can be exposed directly to the ocean environment. These items are not available off the shelf, nor do sufficient environmental data exist to permit the straightforward design of needed equipment.

Satisfactory pressure-hull electrical penetrators, for example, have required considerable design and developmental work to meet the very rigid performance and safety requirements for deep sea applications. Electrical cable technology has been a major stumbling block in all undersea applications. Diving and surfacing of a vehicle places cyclical pressure stresses on all items exposed to the environment. Methods must be developed to insulate current-carrying wires without producing the slightest void or bulk-modulus mismatch because the expansion and contraction break insulation and create shorts. This is happening today.

In another area, the problems of pumping a corrosive and erosive fluid carrying particulate matter, especially near the seafloor, have plagued the development of seawater pumps for ballast control.

Similarly we have very little design data for high-pressure seals for pressures beyond those associated with depth of 10,000 feet. Lubricating and insulating fluids undergo significant changes in viscosity and other properties when subjected to high hydraulic pressures. As a result, even the simplest application is difficult to verify.

All these required advances in the technological capability of our Nation, cost time and money. Without them the delivery of production vehicles will be delayed and extensive prototype development works may be required on systems originally planned as production models.

These problems are not unique to deep sea applications. Similar needs exist in desalination, fishing, offshore mining and petroleum, and other marine industries.

ACQUISITION OF DATA

Today, design information on ocean engineering is clearly inadequate. The Government, scientists, research engineers, and publishers of technical books must work together to make design data available on successful methods, basic background information, and case studies of failures.

A critical need exists in technology development for a significant increase in the number and quality of major test and evaluation facilities for large undersea vehicles, platforms, and extended-depth equipment. Several design approaches might work, but frequently only one has received the testing that makes it certifiable. Thus, an inferior, state-of-the-art methodology may occasionally be used because of a lack of engineering background and test data on more efficient approaches.

Industry has found it appropriate to develop and operate small-scale environmental test facilities. The private sector is nevertheless hampered by severe economic limitations. The facilities for gathering engineering data on components and subsystems needed at great depths or in especially hot, cold, or highly saline waters require a high capital investment which many times is beyond the means of industry. The lack of these additional facilities and the inaccessibility of existing facilities, many times due to lack of money, can significantly deter marine resource development.

THE MANAGEMENT PROBLEM

Now, I would like to turn to the management aspects. To build the desired national oceanic capability, we urgently need a stable, long-range engineering development program. However, because a reasonable return on investment is a basic requirement, management must work within budget and schedule constraints to produce effective marine systems.

In a technologically complex field such as ocean development, problems arise in two areas. First, there is a fundamental conflict between the objectives of research and development and those of production; second, in setting priorities, a program manager must place the production of hardware to contract specifications, the attraction of more business, and the improvement of existing products well ahead of research or long-range engineering development.

Consequently, when money gets tight or costs increase, project or mission management inevitably must sacrifice both long-range engineering research and advanced technology development to the short-term mission requirements of the operating division or agency.

For this reason, industry has separated its research and development divisions, whose task is to develop advanced technology, from its project organizations or product divisions. R. & D. programs are budgeted on the basis of a company's long-range plans and are protected by higher management policy.

Within the U.S. governmental and congressional structure, I do not believe we have an organization or management to insure that advanced ocean technology is being developed for the future. This is one critical problem that we must solve. There are some 33 different Federal bureaus and agencies involved in ocean affairs; advanced technology obviously is needed for more efficient operations by these agencies.

Because of splintered funding, however, they continue with existing technology and are unable to exploit the full potential of their resource or mission. If they try to launch a new developmental effort without the basic technology, the program is usually faced with overruns or failure.

If several agencies wish to get together to advance a given technology, they must jointly convince several governmental committees; the importance of funding basic technology usually cannot be justified on the basis of any single agency need.

NATIONAL ORGANIZATION

I believe the Commission recognized these problems, having possibly noted a similar problem that existed in the early days of aircraft development. In the 1920's and 1930's, when the Army, the Navy, and commercial aircraft industries were struggling to get started, all needed the same basic technology. The NACA was established to provide the data for both Government and industry. I believe that this organization was the key impetus to the growth of the great aerospace industry of today and to its accomplishments in commercial transportation and defense.

Through its advisory committee arrangements, the NACA was responsive to the national needs of Government and industry; it thereby assured that its efforts were professionally related to genuine future mission requirements. It provided an infant industry with the kind of storehouse of technical knowledge that is missing in the infant ocean industry of today.

An organization such as the proposed National Oceanic and Atmospheric Agency, NOAA, with the guidance of the National Advisory Committee for the Oceans, NACO, could provide the same service to the Nation. Furthermore, in any governmental reorganization, provision for the economical accomplishment of the long-range engineering and advanced technology tasks is one of the most important considerations. A critical mass of funding and a single congressional focal point are needed to provide budgetary priority, allocation, and stability. This engineering development function of government, that

is, developing new capabilities, new technology, and better ways of doing things, supports all the other Government marine functions—Government services such as mapping, survey and forecasting, scientific research, and defense—and certainly promises to lower the costs of ocean operations for all agencies involved.

No matter how the Government organizes, however, I agree with Dr. Thomas C. Kavanagh on the functions of the technology development group. In closing, I would like to quote from Dr. Kavanagh's identification of those functions in his statement to this committee on May 14, 1969:

1. Support and coordinate the long-range engineering research and development required for implementing the U.S. Government's current and future functions and missions in the marine environment.

2. Collect, generalize, and disseminate scientific research and engineering research and development data and information concerned with the ocean.

3. Avoid unintentional duplication of engineering development within U.S. Government agencies.

4. Provide a forum to coordinate, as appropriate, the research, the long-range engineering development, and the short-range engineering development among the U.S. Government, the private sector, and State governments.

Thank you for the opportunity of presenting this statement. I would be happy to answer any questions you would like to ask.

Mr. LENNON. Thank you very much, Mr. Wheaton.

Throughout your statement there is a theme of Federal and private cooperation, each being left to do that for which it is best fitted. In your estimate, would the Federal organization be best fitted to accomplish this cooperative venture into the oceans? Are there other organizations that would be better equipped?

Mr. WHEATON. I take your question to mean whether the U.S. Government or State and local governments are best fitted to work in cooperation with the private segment—universities, institutes, and industry.

I think there is an important role for each segment—but perhaps the key role is leadership by the U.S. Government. Great risks and difficulties must be met and overcome in order to make the ocean routinely available to mankind. Under the Federal system of governmental organization, it is the U.S. Government which is best equipped to spend public capital on exploratory projects which have long-term pay-back periods and very broad benefits. This is especially true in ocean exploration projects of both the scientific type (geophysical and biological) and the engineering type (leading to advanced technology).

Mr. LENNON. What safeguards, if any can and should be created to assure that a new effort in the oceans will be a national, as opposed to a Federal effort? The question is intended to differentiate between Federal assistance to the private sphere and Federal development of operational capacities.

Mr. WHEATON. The Commission appropriately placed heavy emphasis on the importance of a national as opposed to Federal ocean program. The technology panel report, on page VI-23, says:

The states and regions, private enterprise, the academic community, and the U.S. Government all have vital roles to play. These roles can be responsive and coordinated only if they are provided with a means for cooperative long-range planning and national guidance.

The report then presented two basic principles key to oceanic progress :

First,, a mechanism must be established to provide national perspective and guidance to the Nation's engineering and technology efforts. Second, recognition must be made of the necessity of continual additions to fundamental technology. This latter principle leads to the importance of assuring that funds to support fundamental technology development are adequately distinguished from agency general operating funds so that a steady and continuing fundamental technology program can be assured without interruption.

The response to the first principle, and one element of safeguard, should be the formation of the national advisory committee for the oceans (NACO). I emphasized a second safeguard in my statement, and it is also the panel's second principle. Because mission management will inevitably sacrifice long-range engineering research and advanced technology development to short-term needs, the fundamental technology program should be budgetarily independent. Also, the major portion of the work should be done on a contract basis outside of Federal laboratories. The fundamental technology program then will provide assistance to the private sphere while enhancing the effectiveness of Federal operational capabilities within its functional missions such as exploration and survey.

A third safeguard is for the Congress to assure that the oceanic missions to be performed by the U.S. Government and the principles presented in the testimony of myself and others are clearly spelled out in the legislative charter given the executive branch as a result of these hearings. A final safeguard is to assure that there remains an open door for independent advisory groups not attached to the U.S. Government nor appointed by Government officials.

Mr. LENNON. Should NACO be created along with and tied to NOAA, or can it exist with a life of its own? If NACO can be independently established, whom should it advise? What powers should it be given, assuming that it is independently established, to assure that it can carry out coordination of Federal efforts effectively?

Mr. WHEATON. I believe NACO definitely could be created independently of NOAA. It should advise the President, through his science adviser, the Congress, and each of the executive agencies with ocean missions. NACO's powers should include (1) the publication, review, and updating of 10-year objectives for the national ocean program, (2) the publication of an annual review and assessment of the progress of the United States toward meeting the national goals, (3) assignment of lead agencies for programs of multiagency interest, (4) review of plans and budget requests of U.S. Government agencies, taking into account efforts outside the U.S. Government, to avoid unintentional duplication of engineering development, and (5) perhaps most important, NACO could be given the responsibility to carry out the technology development and data dissemination functions. A technology development group could be attached to NACO and be assigned the task of providing new technology to meet the U.S. Government's missions in the oceans in accordance with national priorities. Since each of these five powers would benefit all the Government agencies with ocean roles, very close coordination and cooperation among them would be assured.

Mr. LENNON. At the close of your statement, you reflect that government ought to organize along functional lines. As far as engineer-

ing development is concerned, would the functions that you mention be fulfilled by NOAA as it is presently envisaged? How do these functions relate to the needs of other users of the oceans, to the best of your knowledge?

Mr. WHEATON. The Commission proposed that NOAA be given a technology development function. The function should include Dr. Kavanagh's four points indicated at the close of my statement. The key to a successful technology advancement program is protection of the funds for engineering development from the operational needs of the mission oriented groups in NOAA, as we have done with our R. & D. divisions in industry. An alternative, assuring protection of the technology advancement budget, would be to fund the technology group under NACO, as I indicated in my response to question 3. Agency mission needs must not be allowed to override the goal of advancing ocean technology as NASA allowed its operational missions to retard its basic assignment—advancement of fundamental technology in aeronautics and space.

In either event, the technology development function is critical to the effective development of the oceans as a resource by the users of the oceans. Examples of the needs of others which could be met are an order of magnitude improvement in capability for such a key mission as exploration, including the U.S. Government survey function for both minerals and fish; a great improvement in weather forecasting; and significantly lower costs for ocean operations such as mapping and oceanographic research. In addition, spin-off to both military and commercial operations could be expected from the resultant advanced technology.

Mr. LENNON. Can an effective program including research, data collection, data dissemination, and technological advances, be effectively developed without a new organization for government? If so, how should it be done?

Mr. WHEATON. I do not think a really effective program in these areas can be achieved without a change in the existing situation, at least to the step of creation of NACO and the technology development group. However, organization per se is not a panacea. What is needed is the formation of a critical mass of competent personnel with a clearly stated direction of purpose and sufficient funds to do the job.

Mr. LENNON. Assuming that NOAA were not to be established, how could industry mobilize to achieve the necessary goals?

Mr. WHEATON. Industry responds to the profit motive and a proper economic and political environment. NOAA was proposed to fulfill government functions which are not the province of industry. The creation of NACO, the formation of an adequately funded technology development group, plus a pronouncement by the President that the United States has adopted a set of national goals in the oceans could go a long way toward providing the environment required for industry and the States to step up their oceanic activities. I believe this could accomplish much of what the Commission intended. But, because the industry is in an infant state, the above steps should be viewed as to the very minimum required to start to open the potential benefits of the oceans to mankind.

Mr. LENNON. Do any other members have any questions?

If not, the subcommittee appreciates your appearance here today.

Our next witness is Dr. Christy. We are happy to have with us this morning a member of the Economic Committee of the Marine Technology Society and a member of the board of directors of the Law of the Sea Institute, Dr. Francis T. Christy, Jr., of Resources for the Future.

Will you proceed, sir, and if we have time to question both of you, we certainly look forward to it.

(Dr. Christy's biographical résumé follows:)

BIOGRAPHICAL RÉSUMÉ

Born November 4, 1926, Brooklyn, N.Y. Ph.D. (Conservation), University of Michigan, 1964. Research Associate, Resources for the Future, Inc. since 1953.

BOOKS

Potter and Christy, *Trends in Natural Resource Commodities* (Baltimore: Johns Hopkins Press for Resources for the Future, Inc., 1962), 569 pp.

Christy and Anthony Scott, *The Common Wealth in Ocean Fisheries* (Baltimore: Johns Hopkins Press for Resources for the Future, Inc., 1965), 281 pp.

ARTICLES

"Realities of Ocean Resources," *Marine Technology Society Journal*, Vol. 3, No. 1 (January 1969), pp. 33-38.

"Economic Criteria for Rules Governing the Exploitation of Deep Sea Minerals", *The International Lawyer*, Vol. II, No. 2 (January, 1968) pp. 224-242.

"Alternative Regimes for Minerals of the Sea Floor," *Natural Resources Lawyer*, Vol. I, No. 2 (June 1968), pp. 63-67.

"Protein Concentrate and a Rationalized Fishery," in Earle O. Heady, ed., *Alternatives for Balancing Future World Food Production and Needs* (Ames: The Iowa State University Press, 1967), pp. 145-158.

"The Distribution of the Sea's Wealth in Fisheries," in L. Alexander, ed., *The Law of the Sea* (Columbus: Ohio State University Press, 1967), pp. 106-21.

ORGANIZATIONS

Member, Executive Committee, The Law of the Sea Institute; Economic Potential Committee, Marine Technology Society; Law Committee, Marine Technology Society; Commission to Study the Organization of Peace; Economic Advisory Committee, Bureau of Commercial Fisheries; Advisory Panel for Sea-Grant Projects, National Science Foundation; Consultant, National Council on Marine Resources and Engineering Development.

STATEMENT OF DR. FRANCIS T. CHRISTY, JR., RESOURCES FOR THE FUTURE, INC., WASHINGTON, D.C.; MEMBER, ECONOMICS COMMITTEE, MARINE TECHNOLOGY SOCIETY; AND MEMBER, BOARD OF DIRECTORS, LAW OF THE SEA INSTITUTE

Dr. CHRISTY. Thank you.

Mr. Chairman and members of the committee, I appreciate the opportunity to be here today. I have prepared a statement which I will not read in the interest of saving time.

Mr. LENNON. Without objection, Dr. Christy's statement will be inserted in the record immediately following his summary of his statement. Thank you very much.

Dr. CHRISTY. Thank you, Mr. Chairman.

I restricted my statement to one specific area of the Commission's report because I felt that this was a particularly important one and

one that should receive attention by Congress, and that is the rehabilitation of the domestic commercial fisheries of the United States.

The Commission's recommendations on this are quoted on page 2 of my statement. I agree wholeheartedly with these three recommendations.

The first is that the major objective should be that of obtaining the largest net economic return consistent with the biological capabilities of the stocks.

The second recommendation is to reduce excess fishing effort, and I think this is critical.

And the third recommendation is that the Federal Government be given statutory authority to assume regulatory jurisdiction under certain conditions and where necessary.

The economic condition of fisheries is, as we all know, in a bad state. To me, one of the primary reasons for this sad state of affairs is the absence of exclusive rights of property; rights which are available in almost all other industries that attract American enterprise.

Under these conditions, where there are no exclusive rights of property and where there is open access to the stock, the fishery tends to attract far more fishermen than is desirable or economically efficient.

On page 4 I give some estimates of the amount of economic waste. For example, a study by Crutchfield and Pontecorvo, indicates that the same amount of Pacific salmon could be taken with \$50 million less vessel and labor than is now being used annually. In the past 25 years the Alaska salmon catch has actually decreased by more than a third while the number of fishermen has more than doubled.

The reasons for this is that under the condition of open access any surplus or excess profit is shareable, and attracts more and more fishermen into the industry until the industry operates where total costs and revenues are equal and the excess shareable profit is diminished or decreased to zero.

To quote the Commission on this, it says that, "Until and unless it becomes possible to reduce the amount of gear to the minimum needed to take the permitted catch, economic waste, widespread violation of regulations and a threat to the very existence of the industry will remain."

To me then it is critical that we adopt some means and some techniques for controlling access to fisheries, for providing to a satisfactory degree the kind of property rights and exclusive rights that are available to almost all other industries in the United States.

The problem comes, and I am sure that you all recognize this, in that the establishment of controls on entry will exclude some and permit others to operate.

MR. KERTH. On what kind of fisheries did you say?

DR. CHRISTY. These are open-access fisheries. Almost all the fisheries of the United States are under these conditions. There are certain fisheries such as the sedentary fisheries, oysters, and others, where property rights do pertain.

The problem comes in reducing the amount of effort in those fisheries where fishermen already have vested interests, have already invested their time and labor and capital. In these situations, it is very difficult to remove the superfluous fishermen. This is recognized by the Commission. There are ways and means of achieving this, but inevit-

ably they are accompanied by some degree of hardship and by a number of other difficulties, some of which I have listed on the top of page 6.

The Commission recommends that under certain conditions, that is the depletion of the stock, an interstate or international fishery, a product that moves in interstate commerce, and the inability or unwillingness of the States to act, that the Federal Government intervene and exercise regulatory authority in the interest of achieving this reduction in effort.

While I think this is probably unfortunately necessary for a large number of stocks, I would like to point out that there may be opportunities for achieving the same goals with a great deal less hardship and difficulty. These were touched on by the Commission but were not given as much attention as they might have been. That is, that there are newly developing or underdeveloped stocks of fish in which it might be a lot easier to impose the controls on entry, to impose them prior to the time in which the fishermen have reached excess effort.

There are three different situations that might provide these opportunities. The first would be the discovery of a new source of a fish species for which there is a recognized demand. The second would be the development of a market for a species that is presently underutilized, and the third would be a significant change in the conditions of supply (a major innovation in gear or perhaps a relaxation of an institutional impediment).

Some examples of such situations would include the scallops of the southeastern United States, the Tanner crabs in the Bering Sea, the use of hake or other species for fish protein concentrate or the removal of impediments to the anchovy fishery off California, and others.

In these situations the fishermen have not overcapitalized. There are not too many fishermen. There is a chance at this time to establish some forms of access control, to limit the number of fishermen, and then to achieve through this means a rational fishery and to demonstrate the value of having these kinds of property rights in the stock.

It seems to me that if these kinds of opportunities are taken hold of, that it would provide the chance of initiating similar kinds of controls in some of the more overdeveloped fisheries that exist today.

So in summary I would like to add my emphasis to that of the commission on the importance of economic efficiency as a goal for fisheries management.

I fully concur in the commission's analysis and its conclusions that controls in access to fisheries are absolutely necessary for the rehabilitation of domestic fisheries.

The commission's recommendation that the Federal Government be given statutory authority to intervene in certain situations is vital, even though it is to be hoped that such intervention will not be necessary.

Finally, I suggest that certain newly developing fisheries may provide the best opportunities for initiating access controls and the adoption of rationalized fisheries management.

I would like to say just a few words about reorganization of the Federal Government.

I am not a scholar of public administration and I do not have very strong feelings one way or the other about the reorganization of the

Federal Government. I would like to point out, however, that I think that there is only one common element to the oceans, and that is the salt water, and that this common element relates to as wide a range of uses as appear on land.

To have a separate agency for the ocean may in a sense be like having a separate agency for land with all the manifold varieties of resources and uses that operate within the land environment.

Thus, I think that there is always going to be great diversity of interest in the oceans and that it will always be quite difficult to coordinate these interests.

I agree that there is need for greater coordination. I am just not sure whether we should be entirely sanguine that we can achieve it by means of reorganization of the Government.

Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Dr. Christy, for certainly an interesting, and, I believe, a really informative discussion of a very vital area that we should consider and must consider, the rehabilitation of the U.S. domestic fisheries.

I would like to ask unanimous consent that Dr. Christy's biographical résumé be inserted in the record immediately preceding his statement to the committee. We have already obtained unanimous consent that his full statement will be inserted in the record following his summary of the same.

(The full statement follows:)

STATEMENT OF FRANCIS T. CHRISTY, JR., RESOURCES FOR THE FUTURE, INC.

Mr. Chairman and members of the Committee, I appreciate the invitation to participate in these hearings on the Report of the Commission on Marine Science, Engineering and Resources. My name is Francis T. Christy, Jr. I am a Research Associate at Resources for the Future, Inc., which is a nonprofit, tax-exempt organization that undertakes and sponsors social science research on problems and issues of natural resource development and conservation.¹

My comments on the excellent Report of the Commission on Marine Science, Engineering and Resources are restricted, at this time, to one specific subject—the rehabilitation of U.S. domestic fisheries. I make this restriction because of (a) the difficulty of providing detailed commentary on a document that is so comprehensive and thorough; (b) the expectation that the 'development of "a plan for national action" will take several years and provide future opportunities for comments; (c) the importance of fisheries; and (d) the fact that the conditions necessary for economic efficiency in fisheries are also necessary for economic efficiency in the development of other marine resources. In commenting on the Report, I hope to add emphasis to its recommendations on fisheries management and to suggest a possible means for facilitating the adoption of these recommendations. The three recommendations to which I refer are as follows:

The Commission recommends that fisheries management have as a major objective production of the largest net economic return consistent with the biological capabilities of the exploited stocks. (Report, p. 92).

The Commission recommends that voluntary steps be taken—and, if necessary, Government action—to reduce excess fishing effort in order to make it possible for fishermen to improve their net economic return and thereby to rehabilitate the harvesting segment of the U.S. fishing industry. (Report, p. 93).

The Commission recommends that the National Oceanic and Atmospheric Agency (NOAA) be given statutory authority to assume regulatory jurisdiction of endangered fisheries when it can be demonstrated that:

A particular stock of marine or anadromous fish migrates between the waters of one State and those of another, or between territorial waters and the contiguous zone or high seas, and

The catch enters into interstate or international commerce, and

¹ A brief biography is attached. The views expressed in this statement do not necessarily represent the views of Resources for the Future, Inc.

Sound biological evidence demonstrates that the stock has been significantly reduced or endangered by acts of man, and

The State or States within whose waters these conditions exist have not taken effective remedial action. (Report, p. 97.)

THE ECONOMIC CONDITION OF FISHERIES

Comprehensive measures of the economic condition of U.S. fisheries are not readily available because of the deplorable inadequacy of meaningful statistics.² The poor health of many segments of the industry, however, is clearly evident in obsolete vessels, high age of fishermen, and low returns to capital and labor. "The average age of the U.S. fishing vessel in 1966 was 20.3 years. Only four new vessels have been added to the Boston offshore trawler fleet in the past 16 years, and the average Pacific coast halibut vessel was built 36 years ago. . . . One major effect of all (the) forces working against improved efficiency in the harvesting of fish has been a reduction in the average output per U.S. fisherman which, since 1964, has fallen below the 1957-59 average. Conversely, for the U.S. economy in general, the average output per worker increased over 30 percent from 1957 to 1967 and, in agriculture—an industry whose products compete with fish in the food market—there has been a 67 percent increase."³

COMMON PROPERTY AS A CAUSE OF ILL HEALTH

Many factors contribute to the poor health of the fish catching industry. But the most important one is that U.S. fisheries are managed as common property natural resources. Under this system, access to the fishery is open to anyone who cares to invest in the necessary equipment. There are no exclusive rights of property and no way of preventing the application of excessive amounts of capital and labor.

As a fishery develops, it tends to produce surplus returns to the fishermen; i.e., returns above and beyond those that are necessary to keep the fishermen in the industry. These surplus returns, or extra profits, are shared by all participants and they attract more fishermen until all such returns are dissipated. At this point, total revenues to the industry will just cover (or, in many cases, actually be less than) total costs, and no economic rent will be produced.

In almost all other resource industries, such conditions have never existed or have long since been abandoned. Exclusive rights of property are fundamental to most American enterprise, and they permit the entrepreneur to employ only as much capital and labor as will produce the maximum *net* economic return. With exclusive rights of property, the industries operate at the point where marginal costs and revenues are equal, rather than total costs and revenues. But under the conditions of common property, such as exist for fisheries, the use of wasteful, and redundant amounts of capital and labor becomes inevitable.⁴

Several economic studies indicate the magnitude of this waste. A study of the Sacramento River salmon fishery has shown that \$3.3 million worth of annual catch could be taken with \$300,000 worth of effort under rational management.⁵ For the Pacific salmon fisheries as a whole, Crutchfield and Pontecorvo have demonstrated that the same total catch and same gross revenue could be taken with about \$50 million less in annual costs of vessels and labor.⁶ In the past 25 years, the catch of Alaska salmon has actually fallen by 34%, and yet the number of fishermen has increased by more than 110%.⁷ "The present annual catch of Georges Bank haddock could be taken with 30 percent fewer vessels than now used. This would mean that total revenues would remain the same but that total costs would

² "The deficiencies (in statistics) make it impossible at the present time to assess the economic health of any segment of the U.S. fishing industry or to forecast the economic results of alternative programs without detailed ad hoc efforts to develop the necessary factual background, case by case." *Report of Panel on Marine Resources*, p. VII-47. The Commission's recommendations on the vital need for improved statistical data are particularly urgent and important.

³ *Marine Science Affairs, The Third Report of the President to the Congress on Marine Resources and Engineering Development* (Washington: GPO, 1969), p. 94.

⁴ See *Report of the Panel on Marine Resources*, pp. VII-63-69.

⁵ Donald H. Fry, Jr., "Potential Profits in the California Salmon Fishery," *California Fish and Game*, XLVIII, No. 4 (October, 1962), pp. 256-67.

⁶ James Crutchfield and Giulio Pontecorvo, *The Pacific Salmon Fisheries: A Study of Irrational Conservation* (Baltimore: Johns Hopkins Press for Resources for the Future, Inc., 1969), p. 174.

⁷ Resources for the Future, Inc., *Annual Report 1968* (Washington: RFF, 1968), p. 98 (derived from Crutchfield and Pontecorvo, op. cit.)

diminish considerably. Each vessel, now operating at an average annual loss of \$8,000 per year, could instead be earning a profit of \$30,000, and annual income per fisherman would increase from \$6,600 to over \$10,000."⁸

The only means for preventing such gross economic waste and for rehabilitating the domestic fisheries is by controlling the number of fishermen and vessels—for approximating to as high a degree as possible, the property conditions that are fundamental to our free economy. "Until and unless it becomes possible to reduce the amount of gear to the minimum needed to take the permitted catch, economic waste, widespread violation of regulations, and a threat to the very existence of the industry will remain."⁹

It might be pointed out in passing that the necessity for some form of exclusive right of access is equally important for the development of a viable mineral industry for the ocean floor. This is widely acknowledged. The problem is not one of proving the necessity for such rights, but of finding the institutions and means that can best provide and maintain them. The Commission's recommendations for such institutions are generally excellent.¹⁰

PROBLEMS OF CONTROLLING ACCESS

With respect to the domestic fisheries, however, the institutions and means for providing some form of exclusive rights are far more difficult to achieve. This is due to several factors. First, most fish refuse to remain in one place and will freely swim across interstate and international boundaries. Second, there is a strong tradition of the freedom of the seas and the freedom of all citizens to hunt and fish. Third, open access to fisheries provides a form of unemployment insurance—a means of livelihood to which people can resort in times of depression. Fourth, the individual States have traditionally been given the power to regulate the fisheries within their waters. And finally, the need for controls on access generally do not become apparent until after excess fishermen have already entered the fishery and the interests have already become vested.¹¹

In view of these difficulties, it may be asked whether or not the benefits of fisheries rehabilitation are worth the costs and hardships that must be incurred in order to achieve the rehabilitation. My bias toward economic efficiency leads me to believe that they are, and to support wholeheartedly, the Commission's recommendation, quoted above, on the objective of producing "the largest net economic return consistent with the biological capabilities of the exploited stocks." Others may have different opinions and society may choose to reject this objective. But it should be made clear that the objective of fisheries rehabilitation cannot be achieved unless there are controls on access, and unless the difficulties, described above (as well as others), are overcome.

WAYS AND MEANS FOR CONTROLLING ACCESS

The Commission suggests a number of ways and means for establishing controls on access to domestic (and international) fisheries. Emphasis is placed upon the necessity for some form of interstate or Federal authority on the clearly demonstrated basis that individual States, by themselves, cannot adopt the necessary controls in most fisheries. It is suggested that the Federal Government be given statutory authority to intervene under certain conditions. Here again, I fully agree with the Commission's recommendations.

However, it seems to me that the Commission failed to emphasize certain opportunities that may exist for facilitating the initiation of access controls. These opportunities apply to only a few fisheries, but they avoid one of the most intransigent difficulties mentioned above—the problem of reducing access to a fishery that is already over-capitalized and in which interests have become strongly vested. If such opportunities are seized, they would provide clear

⁸ *Marine Science Affairs*, op. cit., p. 93.

⁹ *Report of the Panel on Marine Resources*, p. VII-66.

¹⁰ The major difference of opinion that I have with the Commission's recommendations lie in the means for allocating exclusive mining rights. I would prefer an auction mechanism to the "first come-first served" registry proposed by the Commission, first because it provides for a non-arbitrary allocation of exclusive rights and second because it provides the fairest means for determining the value of the right, and the appropriate payment to the International Fund. See Christy, "Economic Criteria for Rules Governing Exploitation of Deep Sea Minerals," 2 *International Lawyer* 224 (January 1968). The summary of my position in the *Report of the International Panel* (VIII-96-98) is inaccurate.

¹¹ For a fuller discussion of these factors, see Christy, "Fisheries Goals and the Rights of Property," *Transactions of American Fisheries Society*, vol. 98, No. 2 (April 1969), pp. 369-378.

demonstrations of the value of access controls and would help lead to adoption of such measures in other, more difficult, fisheries.

The opportunities exist in the underdeveloped or newly developing fisheries. These, as pointed out by the Commission, "would present relatively few practical problems." (*Panel Report*, pp. VII-67-68) Moreover, they could be made very attractive to the participants by guaranteeing them freedom from congestion and wasteful competition, and providing them a share of the economic rent that would be produced.

Three different situations might provide the opportunities. The first would be the discovery of a new source of a fish species for which there is a recognized demand. The second would be the development of a market for a species that is presently underutilized. And a third would be a significant change in the conditions of supply; i.e., a major innovation in gear or, perhaps, a relaxation of an institutional impediment. Some examples of such situations would include scallops off the southeastern United States; tanner crabs in the Bering Sea; the use of hake or other species for a fish protein concentrate;¹² the removal of the impediments to an anchovy fishery off California; and others.

The opportunities would be limited to those stocks that are not utilized by the vessels of other nations, for it would be futile to limit U.S. access if other nations have no such restraints.

The choice of a newly developing fishery would not obviate all of the difficulties of establishing access controls. There would still remain the problems of determining the number of licenses, the kind of vessel or amount of share to be licensed, the method of allocating licenses ("first come-first served" or auction), the amount of payment for the property right that is acquired, etc. But these difficulties would attend any scheme for the limitation of access.

The Commission's recommendations to the intervention of Federal authority on stocks that are already depleted is entirely appropriate and relevant to most of the situations that exist today. However, I would recommend that the Federal Government also be granted authority to institute controls on access in those situations where vested interests have not yet become significant and where the chances of establishing such controls without hardships to the participants are great.

SUMMARY

In summary, I would like to add my emphasis to that of the Commission's on the importance of economic efficiency as a goal for fisheries management. I fully concur in the Commission's analysis and its conclusion that controls on access to fisheries are absolutely necessary for the rehabilitation of domestic fisheries. The Commission's recommendation that the Federal Government be given statutory authority to intervene in certain situations is vital, even though it is to be hoped that such intervention will not be necessary. And finally, I suggest that certain newly developing fisheries may provide the best opportunities for initiating access controls and the adoption of rationalized fisheries management.

MR. LENNON. Mr. Keith.

MR. KEITH. Thank you, Mr. Chairman.

It is very helpful. I think, to have someone, particularly an authority, as you obviously are, concentrate his interest and effort on one segment of this report. It is particularly helpful to me, representing as I do a fishing port, New Bedford. As you probably know New Bedford tends to unload its short lobsters in Rhode Island because of the difference in rules.

Where is your home port?

DR. CHRISTY. That is Washington, D.C.

MR. KEITH. I think it highlights the need for uniform legislation for fisheries, at least as far as lobsters are concerned.

¹² I have made a specific suggestion for such a development in a paper entitled, "Protein Concentrate and a Rationalized Fishery," in Earle O. Heady, ed., *Alternatives for Balancing World Food Production and Needs* (Ames, Iowa: The Iowa State University Press, 1967). I suggested that the Federal Government might guarantee to buy fish for its FPC plants provided that the States would limit access to its fisheries. This would provide an incentive for drawing off the excess fishermen in the traditional fisheries.

Dr. CHRISTY. I agree wholeheartedly on that, that the diversity of rules and regulations is such that it is almost impossible to achieve rational rules without interstate cooperation and possibly without some Federal intervention.

Mr. KEITH. But we must not tilt with windmills. We know that it is impossible, or has been thus far impossible, to amend some of the legislation pertaining to crew and to the construction of vessels.

What are our chances of achieving in the foreseeable future the objectives of which you speak so enthusiastically as you view this segment of the problem?

Dr. CHRISTY. Well, I wouldn't know how to evaluate the chances. I think that in certain instances and in certain cases we may begin to achieve this kind of management. We do so now in some cases in a de facto manner.

You may know that in some of the Maine lobster fisheries the lobstermen themselves in a sense control the amount of effort. That is, if a foreigner to Maine comes in and attempts to plant lobster pots in several areas, he is quite hastily discouraged from doing so.

We have the same kind of situation in oysters in Worcester County in Maryland. So that there are attempts to do this in certain cases.

Mr. KEITH. But that is, is it not, because of the State's rights with respect to the shoreline, and the 3-mile limit? Doesn't the State have jurisdiction?

Dr. CHRISTY. The State has jurisdiction, but these are de facto rather than de jure, that is, the fishermen themselves have recognized the need for it and have done it in some way or other.

Canada has begun to control entry with respect to the lobster fishery and the salmon fishery on the Pacific coast. They have a kind of license scheme that they are getting underway.

What I am suggesting in my testimony is that there may be opportunities for doing this in the newly developing or presently underdeveloped fisheries where you would not create hardship for the fishermen themselves and where you would provide the opportunity for initiating this kind of a scheme.

Mr. KEITH. Can you give us a specific example?

Dr. CHRISTY. The anchovy fishery off California, for example, has been underdeveloped because of the rules and regulations against the reduction plants for anchovies. As this institutional impediment is removed, we can open up an anchovy fishery and at the same time limit the number of fishermen without creating hardships.

The State or the Federal Government could employ this kind of a scheme so that you will stop at the point prior to the employment of excess numbers of anchovy fishermen.

Mr. KEITH. Well, this is good in theory, but where can I as a Congressman make a start toward achieving some of the objectives that you have in mind?

It seems to me that the one you chose is limited to the west coast and a regional approach would be much more possible than a national program requiring Federal legislation.

Dr. CHRISTY. Well, I agree that it would be preferable.

Mr. KEITH. Is there any area at the Federal level where legislation might be passed to further tackle this problem?

Dr. CHRISTY. The third recommendation I quoted on page 2 gives this. That is: "The Commission recommends that the National Oceanic and Atmospheric Agency (BCF) be given statutory authority to assume regulatory jurisdiction of endangered fisheries when it can be demonstrated that * * *"

What I am suggesting is that perhaps it could be given statutory authority to assume regulatory jurisdiction under other circumstances as well.

Now, this would give the Federal Government an opportunity to insist that there be some form of appropriate regulation. It may be that simply giving the Federal Government the opportunity would help stimulate State governments to cooperate among themselves in the establishment of the right kind of rules and regulations.

Mr. KEITH. Do you know of any response to these recommendations by the Commission within any State or Federal agency or within any part of the private sector?

Dr. CHRISTY. No, I do not.

Mr. KEITH. You mentioned while speaking on the FPC that hake or other such species should be used for fish protein concentrate. You are aware of the ruling now that permits hake or hake-like fish to be used. Can you make specific recommendations as to how that authority might be broadened or how lake fishing might be increased?

Dr. CHRISTY. I did so in a paper I presented a few years ago.

Mr. KEITH. In 1967?

Dr. CHRISTY. Yes; at a conference in Iowa on World Food Population.

Mr. KEITH. I cannot think of a better location.

Dr. CHRISTY. I thought it might be useful to do so in the heartland of America. The recommendation that I was making was that this would provide an opportunity for reducing hardship in the establishment of entry controls and limitations; that is, that the Federal Government might guarantee to buy the fish stock that it would want to use for the fish protein concentrate, provided that the States involved establish a license limitation scheme on their fishermen.

This would then provide the opportunity for those excess fishermen in the traditional fisheries moving out, and into providing the Federal pilot plant with the material for the fish protein concentrate.

Mr. KEITH. Do you have any particular fish in mind?

Dr. CHRISTY. At the time I was thinking of the hake on the west coast.

Mr. KEITH. Well, the hake are already permitted.

Dr. CHRISTY. They are so what?

Mr. KEITH. You can presently fish for hake.

Dr. CHRISTY. That is right. But it has not reached the point where there is an excess number of fishermen.

Mr. KEITH. No. As a matter of fact there is a shortage of hake.

Dr. CHRISTY. I am not aware of that. You mean a shortage of hake, that they cannot provide enough at the right price?

Mr. KEITH. That is correct.

Dr. CHRISTY. That may be a question of price.

Mr. KEITH. In fact, we were unable to implement the first order for hake or hake-like fish, because there was an inadequate supply.

Dr. CHRISTY. I was not aware of that. I think it may still apply if certain kinds of species and stocks can be found.

Mr. KEITH. What is your employment? I noted here that you are a consultant and member of many organizations, but what is the source of your income?

Dr. CHRISTY. It is Resources for the Future, Inc., which is a tax-exempt, nonprofit corporation in Washington undertaking research on the social science aspects of natural resource policies and issues.

Mr. KEITH. Who funds that?

Dr. CHRISTY. This is funded entirely by the Ford Foundation.

Mr. KEITH. Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Keith.

Mr. DOWNING?

Mr. DOWNING. This is a most interesting statement, Dr. Christy. Let's see if I understand it. Do you say that fishing resources are being depleted?

Dr. CHRISTY. Yes, in part. This is not the major brunt of my statement but, under the condition of open access, depletion becomes inevitable as well.

That is, there is no control on the number of fishermen and the incentive of every fisherman naturally is to catch as large an amount as he can. This is perfectly economic for the individual fisherman.

Mr. DOWNING. Are our resources actually being depleted now?

Dr. CHRISTY. In some situations the depletion of U.S. stocks is quite clear. The catch of many of our stocks currently is lower than it has been in the past, and there are opportunities for increasing the catch, generally by reducing the amount of fishing effort. This may sound like a paradox, but this is the way it would operate.

Mr. DOWNING. Do you advocate imposing controls by limiting the number of people who fish?

Dr. CHRISTY. Limiting the number of vessels and fishermen that participate.

Mr. DOWNING. As a practical matter, how would you go about doing that?

Dr. CHRISTY. The best study on this that I have seen is the one by Crutchfield done on behalf of the State legislature of Washington with respect to the Puget Sound salmon fishery.

This recommended that all those presently fishing for salmon on Puget Sound receive licenses; that as attrition takes place because fishermen want to leave the industry or because they die off, or one reason or another, that as this takes place the number of licenses would naturally be reduced.

They would let this occur until the point where they have the most efficient number of licenses in the industry. Then at that time they would maintain that number by offering new licenses as some of the old ones go out.

Mr. DOWNING. I see. It would be something like a hunting license.

Dr. CHRISTY. Well, no, because most hunting licenses can be obtained by anyone without restriction on the number of hunters.

Mr. DOWNING. You would have restricted numbers of licenses?

Dr. CHRISTY. Yes. If, for example, it would be appropriate to have, using this purely as an illustration, 100 licenses in the Puget Sound salmon fishery and there are now 150, which would be somewhat on

the order of the percentage excess amount, then you would provide licenses initially for all 150, and as some of them were removed or as some of them move away and do other things, the licenses would be reduced until you had 100, and at this point you would maintain that at the appropriate number, similar in effect to the taxicabs in New York City.

Mr. DOWNING. Would you impose any territorial limits on the license?

Dr. CHRISTY. This becomes very difficult. If there is a stock that is used internationally, then imposing of license limitations by the United States would not make much sense.

The Commission has recommendations on this element in the Panel Report on the International Resources and Uses of the Sea. They point out, for example, that the same amount of cod and haddock in the North Atlantic that are taken today could be taken by far fewer vessels with savings in the order of \$50 million to \$100 million a year.

Their recommendation for this is to establish national quotas and then, given the fact that a country has a particular fixed quota, it could employ as much or as little labor as it sees fit. This would facilitate the imposition of these kinds of controls.

Mr. DOWNING. Do you advocate licenses by species or general overall licenses?

Dr. CHRISTY. This becomes very difficult. It becomes difficult because of the interrelationships of the species in many cases and because of the different kinds of vessels that are operating on these.

I think it would have to be done in each case according to the particular situation that pertains.

Mr. DOWNING. Thank you very much.

I have one question of Mr. Wheaton, Mr. Chairman. I thought he made an excellent statement, too.

Mr. LENNON. I want to come back if I can to Mr. Wheaton.

Dr. Christy, what you are saying in substance is that in your judgment the only way to substantially rehabilitate the harvesting segment of the United States fishermen is to restrict excess commercial fishing in order to improve the net economic return of those involved.

That being so, and it does appear that something of that nature will ultimately have to be done, how did you react after the Congress had made possible a ship construction subsidy for fishermen, and all of the people who utilized this program were new commercial fishermen, as you know, some time ago, which just spread the problem?

I think you will agree with that. In retrospect, many of us find ourselves wondering why the Bureau of Commercial Fisheries did not go to those individuals and companies who have been in the commercial fishery field for many years and encourage them to rehabilitate their fishing fleets, and thereby increase their net economic return. Instead this made it possible for many newcomers who had never been involved in commercial fishing to be the ones to utilize the ship construction subsidy for commercial fishermen.

The same thing is going on now, according to our best information.

You are a consultant to the National Council on Marine Resources and Engineering Development, which is a council that was created by act of Congress at the time the Commission was created to make this study on the consideration of this report.

In your capacity as consultant and since the Bureau of Commercial Fisheries through the Department of the Interior is represented on the National Council, have you articulated your views to the Council as you have done today?

Dr. CHRISTY. Yes, I have, Mr. Chairman.

Mr. LENNON. Have you met with any reasonably enthusiastic response?

Dr. CHRISTY. Let me say that there has been a limited response. I think that in the last issue of the Marine Science Affairs, there was some greater degree of recognition of the problems and difficulties than there had been in the previous ones, and when I was consulting on this particular issue I had the full support of the Bureau of Commercial Fisheries at that time.

Mr. LENNON. What you are suggesting here in substance is a system comparable to what we had in the Department of the Interior with respect to leases to the petroleum industry, where once you obtained a lease you had authority to exploit the resources found in that particular lease area.

Dr. CHRISTY. Exactly, Mr. Chairman.

Mr. LENNON. You are suggesting, too, that the Federal Government ultimately will perhaps have to move in regarding the migratory fish taken in international waters, or in territorial waters at least, but we have this problem, too.

We are not like some of our nations to the south of us, like Peru and Chile and, to be exact, four others, where they claim out to the 200-mile limit in the territorial sea. What good would this do if the Russian trawler fleet with the mother ship, Canry, was out there 30 miles off the coast, just taking all of our fish?

We are affected by that, too, aren't we?

Dr. CHRISTY. We certainly are. I know that where a fishery is used internationally, voluntary controls, unilateral controls upon entry by one State are not feasible. It would have to begin with those stocks that are not fished internationally, and then perhaps the system can be elaborated throughout some of the international fisheries.

I might point out that the Soviets and the Japanese, for example, do operate under a limited entry scheme.

Mr. LENNON. You certainly have raised some most interesting and challenging observations here as to how we ultimately have to proceed to somehow or other recapture for the American people a reasonable part of our total consumption of edible fish both for commercial purposes as well as for edible purposes.

Does Counsel have any questions of Dr. Christy?

Mr. CLINGAN. I have just one question, Dr. Christy.

When you spoke of reducing fishing effort, you mentioned, I believe, two or three possible alternatives to actual physical exclusion: the development of underdeveloped stocks, new sources of fish species, and significant changes in the condition of supply. Would it be a fair statement that the possibility of achieving such alternatives to alleviate the harshness of actually excluding people could be enhanced by the creation of some national program such as that proposed by the Commission on Marine Sciences?

Dr. CHRISTY. Yes, I think so.

Mr. LENNON. Off the record.

(Discussion off the record.)

Mr. LENNON. Thank you, sir.

Mr. WHEATON, will you come back to the stand, and I recognize the gentleman from Massachusetts to see if he has any questions of Mr. Wheaton.

Mr. KEITH. I don't believe so. Thank you, Mr. Chairman.

I appreciate his statement and his contribution.

Mr. LENNON. Counsel, do you have any questions you want to ask Mr. Wheaton?

Mr. CLINGAN. No, sir, I don't at this time.

Mr. LENNON. Mr. Wheaton, as you graciously responded that you would be happy to respond to any particular questions, off the top of my head I don't have any, having been thinking about the statement of the witness who followed you.

Mr. MOSHER. Mr. Chairman, could I merely have the opportunity to apologize to you and to Mr. Wheaton and Dr. Christy for having arrived late and missed their statements. I certainly will look forward to reading the statements.

Mr. LENNON. I explained that you were before the Judiciary Committee and several other members before the Rules Committee.

Mr. WHEATON. Mr. Chairman, if any questions should come upon my statement, I should be happy to be prepared to answer them either in writing or perhaps at some other date.

Mr. LENNON. Throughout your statement there is a theme of Federal and private cooperation, each being left to do that for which it is best fitted. In your estimate, would the Federal organization be best fitted to accomplish this cooperative venture into the oceans? Are there other organizations that would be better equipped?

Mr. WHEATON. I take your question to mean whether the U.S. Government or State and local governments are best fitted to work in cooperation with the private segment—universities, institutes, and industry.

I think there is an important role for each segment—but perhaps the key role is leadership by the U.S. Government. Great risks and difficulties must be met and overcome in order to make the ocean routinely available to mankind. Under the federal system of governmental organization, it is the U.S. Government which is best equipped to spend public capital on exploration projects which have long-term pay-back periods and very broad benefits. This is especially true in ocean exploration projects of both the scientific type (geophysical and biological) and the engineering type (leading to advanced technology).

Mr. LENNON. What safeguards, if any, can and should be created to assure that a new effort in the oceans will be a national, as opposed to a Federal effort? The question is intended to differentiate between Federal assistance to the private sphere and Federal development of operational capacities.

Mr. WHEATON. The Commission appropriately placed heavy emphasis on the importance of a national as opposed to Federal ocean program. The Technology Panel Report, on page VI-23, says:

The States and regions, private enterprise, the academic community, and the U.S. Government all have vital roles to play. These roles can be responsive and coordinated only if they are provided with a means for cooperative long-range planning and national guidance.

The report then presented two basic principles key to oceanic progress:

First, a mechanism must be established to provide national perspective and guidance to the Nation's engineering and technology efforts. Second, recognition must be made of the necessity of continual additions to fundamental technology. This latter principle leads to the importance of assuring that funds to support fundamental technology development are adequately distinguished from agency general operating funds so that a steady and continuing fundamental technology program can be assured without interruption.

The response to the first principle, and one element of safeguard, should be the formation of the National Advisory Committee for the Oceans (NACO). I emphasized a second safeguard in my statement, and it is also the panel's second principle. Because mission management will inevitably sacrifice long-range engineering research and advanced technology development to short-term needs, the fundamental technology program should be budgetarily independent. Also, the major portion of the work should be done on a contract basis outside of Federal laboratories. The fundamental technology program then will provide assistance to the private sphere while enhancing the effectiveness of Federal operational capabilities within its functional missions such as exploration and survey.

A third safeguard is for the Congress to assure that the oceanic missions to be performed by the U.S. Government and the principles presented in the testimony of myself and others are clearly spelled out in the legislative charter given the executive branch as a result of these hearings. A final safeguard is to assure that there remains an open door for independent advisory groups not attached to the U.S. Government nor appointed by Government officials.

Mr. LENNON. Should NACO be created along with and tied to NOAA, or can it exist with a life of its own? If NACO can be independently established, whom should it advise? What powers should it be given, assuming that it is independently established, to assure that it can carry out coordination of Federal efforts effectively?

Mr. WHEATON. I believe NACO definitely could be created independently of NOAA. It should advise the President, through his science advisor, the Congress, and each of the executive agencies with ocean missions. NACO's powers should include (1) the publication, review, and updating of 10-year objectives for the national ocean program, (2) the publication of an annual review and assessment of the progress of the United States toward meeting the national goals, (3) assignment of lead agencies for programs of multiagency interest, (4) review of plans and budget requests of U.S. Government agencies, taking into account efforts outside the U.S. Government, to a void unintentional duplication of engineering development, and (5) perhaps most important, NACO could be given the responsibility to carry out the technology development and data dissemination functions. A technology development group could be attached to NACO and be assigned the task of providing new technology to meet the U.S. Government's missions in the oceans in accordance with national priorities. Since each of these five powers would benefit all the Government agencies with ocean roles, very close coordination and cooperation among them would be assured.

Mr. LENNON. At the close of your statement, you reflect that Government ought to organize along functional lines. As far as engineer-

ing development is concerned, would the functions that you mention be fulfilled by NOAA as it is presently envisaged? How do these functions relate to the needs of other uses of the oceans, to the best of your knowledge?

Mr. WHEATON. The Commission proposed that NOAA be given a technology development function. The function should include Dr. Kavanaugh's four points indicated at the close of my statement. The key to a successful technology advancement program is protection of the funds for engineering development from the operational needs of the mission oriented groups in NOAA, as we have done with our R&D divisions in industry. An alternative, assuring protection of the technology advancement budget, would be to fund the technology group under NACO, as I indicated in my response to question 3. Agency mission needs must not be allowed to override the goal of advancing ocean technology as NASA allowed its operational missions to retard its basic assignment—advancement of fundamental technology in aeronautics and space.

In either event, the technology development function is critical to the effective development of the oceans as a resource by the users of the oceans. Examples of the needs of others which could be met are an order of magnitude improvement in capability for such a key mission as exploration, including the U.S. government survey function for both minerals and fish; a great improvement in weather forecasting; and significantly lower costs for ocean operations such as mapping and oceanographic research. In addition, spin-off to both military and commercial operations could be expected from the resultant advanced technology.

Mr. LENNON. Can an effective program including research, data collection, data dissemination, and technological advances, be effectively developed without a new organization for government? If so, how should it be done?

Mr. WHEATON. I do not think a really effective program in these areas can be achieved without a change in the existing situation, at least to the step of creation of NACO and the technology development group. However, organization *per se* is not a panacea. What is needed is the formation of a critical mass of competent personnel with a clearly stated direction of purpose and sufficient funds to do the job.

Mr. LENNON. Assuming that NOAA were not to be established, how could industry mobilize to achieve the necessary goals?

Mr. WHEATON. Industry responds to the profit motive and a proper economic and political environment. NOAA was proposed to fulfill government functions which are not the province of industry. The creation of NACO, a formation of an adequately funded technology development group, plus a pronouncement by the President that the United States has adopted a set of national goals in the oceans could go a long way toward providing the environment required for industry and the states to step-up their oceanic activities. I believe this could accomplish much of what the Commission intended. But, because the industry is in an infant state, the above steps should be viewed as the very minimum required to start to open the potential benefits of the oceans to mankind.

Mr. LENNON. Gentlemen, I thank you so much for your appearance here and regret that the circumstances are such that we have to leave to go back to the session.

Since you are available, we will be back in touch with you. Thank you so much.

Let me have Counsel announce the witness who are scheduled for Tuesday, August 12, if you will, Counsel.

Mr. CLINGAN. At 10 a.m. on Tuesday, August 12, we will be honored to have before the committee Dr. Athelstan Spilhaus, former president of the Franklin Institute, and also Dr. Milner B. Schaefer, director of the Institute of Marine Science, Scripps Institution.

Mr. LENNON. With that, the committee will stand adjourned until Tuesday, August 12, at 10 a.m.

Thank you so much.

(Whereupon, at 11:10 a.m., the subcommittee recessed, to reconvene at 10 a.m., Tuesday, August 12, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

TUESDAY, AUGUST 12, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY,
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:20 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Thomas N. Downing presiding.

Mr. DOWNING. The committee will come to order.

This morning we will resume hearings on H.R. 13247 and the report *Our Nation and the Sea*. Our regular subcommittee chairman, Mr. Lennon of North Carolina, will not be able to be here today due to the fact that he has to appear before the Armed Services Committee in an effort to reinstate substantial funding for the Navy's oceanographic program.

So, to the witnesses, he has expressed his regret that he will not be here today. He will, however, resume the Chair tomorrow morning.

This morning our first witness is Dr. Milner B. Schaefer, director, Institute of Marine Resources, Scripps Institution of Oceanography, and former science adviser to the Secretary of the Interior.

Dr. Schaefer, you were second on the list, but we are putting you first because Dr. Spilhaus has not arrived as yet.

(Dr. Schaefer's biographical résumé follows:)

RÉSUMÉ OF PROFESSOR MILNER B. SCHAEFER, MAY 12, 1969

Cheyenne, Wyoming, December 14, 1912.

B.S. Magna Cum Laude, University of Washington, 1935; Ph. D., University of Washington, 1950; International Fisheries Commission, Scientific Assistant 1934-35; Washington State Department of Fisheries, Assistant Biologist 1935-37, Biologist 1937-39; International Pacific Salmon Fisheries Commission, Scientist 1939-42; U.S. Navy, Line Officer, 1942-46; School of Fisheries, University of Washington, Instructor 1946; U.S. Fish and Wildlife Service: South Pacific Fishery Investigations, Stanford University, Fishery Research Biologist 1946-48, Pacific Oceanic Fishery Investigations, Honolulu, Chief of Research and Development 1948-50; Inter-American Tropical Tuna Commission, La Jolla, Director of Investigations 1951-63, Scientific Consultant, 1963—; University of California, Scripps Institution of Oceanography: Research Associate 1951-62, in charge Biology Program, Operation WIGWAM 1954-55, Lecturer 1960-62, Professor of Oceanography and Director, Institute of Marine Resources, 1962—; Science Adviser to Secretary of Interior, 1967-69.

Member, Nat. Acad. Sci. Nat. Res. Council, Committee on Effects of Atomic Radiation in Oceanography and Fisheries 1956-60; Member NAS-NRC Committee on Oceanography 1957-1967 (Chairman 1964-1967) (Panel on Radioactivity in Marine Environment, 1957—; Panel on International Marine Scientific Affairs, 1968—; Steering Committee for Study of International Decade of Ocean Exploration, 1968-1969); Expert on Fisheries on Secretariat of International Conference

on Conservation of Living Resources of the Sea, Rome, 1955; Expert on Fisheries on Secretariat of International Conference on Law of the Sea, Geneva, 1958; Member, U.S. delegation to Int. Scientific Conference on Disposal of Radioactive Wastes, Monaco, 1959; Official observer, Second Int. Conference on Law of the Sea, Geneva, 1960; Consultant, Special Committee of Am. Soc. Limnology and Oceanography on Education and Manpower 1959-60; Representative of Nat. Acad. Sci. on Advisory Board of National Oceanographic Data Center 1960-63; Consultant, Special Fund of the United Nations 1960-65; Member, Latin American Working Group on Earth Sciences of the President's Science Advisory Council 1961; Member, Latin America Science Board Nat. Acad. Sci., 1963-1968; SCOR representative on Marine Communities Working Group for the International Biological Program 1963-64; Member NAS Nutrition Board's Scientific Advisory Committee on Marine Protein Resource Development 1963-; Chairman, Standing Committee on Marine Sciences of Pacific Science Association 1962-66; Member, Study Team for U.S. National Aquarium 1963-66; Member, Study Committee of American Society of Limnology and Oceanography 1964; Food and Agriculture Organization of the U.N.: Member, Panel of Fisheries Experts 1963-; Member, Expert Panel for Facilitation of Tuna Research, 1964- (Chairman 1964-66), Member, IWP (Indicative World Plan) Working Group on Marine Resources Appraisal, 1966-; (California) Governor's Advisory Commission on Ocean Resources 1965-67 (Chairman, 1965-66). Member, Geophysics Research Board of Nat. Acad. Sci.—Nat. Res. Council 1965-67; Member, Committee on Science and Technology of the National Citizen's Commission on International Cooperation 1965; Member, Advisory Committee on Fisheries Oceanography, Department of State 1965-; Member, *ad hoc* Committee for Evaluation of Study of Economic Benefits from the Continental Shelf, Department of Commerce, Environmental Sciences Service Administration, 1965-66; Board of Directors, National Oceanography Association, 1966-67; Board of Directors, Regional Plan Association of Southern California, 1966-67; Consultant, National Council on Marine Resources and Engineering Development 1967, 1969-; Member, Department of Interior Advisory Committee on Marine Resources Development, 1967; Member, California Commission on Marine and Coastal Resources. 1967-.

Scholastic and Professional Societies: Phi Beta Kappa, Sigma Xi; American Society of Ichthyologists and Herpetologists; Pacific Fishery Biologists (President, 1939-40); American Fisheries Society; American Geophysical Union; American Statistical Association; Biometrics Society; American Society of Limnology and Oceanography (President, Western Division 1956-57); American Institute of Fishery Research Biologists (Founding Fellow); Marine Technology Society; Fellow, California Academy of Sciences.

STATEMENT OF DR. MILNER B. SCHAEFER, DIRECTOR, INSTITUTE OF MARINE RESOURCES, SCRIPPS INSTITUTION OF OCEANOGRAPHY; AND FORMER SCIENCE ADVISER TO THE SECRETARY OF THE INTERIOR

DR. SCHAEFER. In fact, Mr. Chairman, Dr. Spilhaus asked me to inform you that he might not get here and to present his apologies. He and I were together in Costa Rica last week on some lobster business that we are involved in together, and I left on Thursday evening. He was going to stay over Friday and to stop by Grand Cayman, and he said in case he did not get here to please present his most profound apologies.

MR. DOWNING. All right.

DR. SCHAEFER. Mr. Chairman and committee members: I am extremely pleased to be invited to appear before you today to discuss a few of the aspects of the report of the Commission on Marine Science, Engineering and Resources.

My name is Milner B. Schaefer. I am professor of Oceanography in the Scripps Institution of Oceanography, and director of the univer-

sitywide Institute of Marine Resources, both parts of the University of California. I have been engaged in scientific research, resources management, and various other aspects of ocean affairs at the State, national, and international levels during the past 35 years. I have already submitted a summary of my long and checkered career.

Mr. PELLY. Mr. Chairman, may I interrupt at that point. I want to say that, representing the University of Washington, the Puget Sound area, I am particularly conscious of the important references in your resume, and I for one am very proud of all the University of Washington graduates and those who are connected with it. I think they sort of monopolize the field of fisheries and oceanography. I think we have something in common, Doctor.

Dr. SCHAEFER. Thank you very much, Mr. Pelly. I am also glad to put in a plug for my alma mater. In fact, until a few years ago practically all the oceanographers in the United States came from the University of Washington, Woods Hole, or Scripps, because that is all the oceanographic institutions there were in those days; and nearly all of the fisheries experts came from the University of Washington.

Mr. PELLY. We have a very fine new building there to house the Oceanography Department, and I have visited there a number of times and feel I have a very important responsibility in representing that great educational institution.

Dr. SCHAEFER. I had an opportunity recently to lecture there. You also have a new Center in Quantitative Science in Fisheries, Forestry, and Wildlife, that I had the pleasure of lecturing at just recently.

Mr. DOWNING. Hopefully, though, this bill that you are speaking on will relieve the monopoly that you now have.

Dr. SCHAEFER. I don't think we have a monopoly any more. All we try to do is stay ahead.

Mr. PELLY. The burden has been pretty heavy on our shoulders, but we are glad to share it with others.

Dr. SCHAEFER. I have outlined in my formal statement, Mr. Chairman, some of the particular experience that I have had, and things that I am presently engaged in, that are particularly pertinent to the topics that I want to talk about today. However, if it is agreeable with you, Mr. Chairman, rather than reading the full statement, perhaps it would be better to submit it for the record and just to summarize the highlights of the contents.

Mr. DOWNING. That would be perfectly all right.

(The statement follows:)

STATEMENT OF DR. MILNER B. SCHAEFER, DIRECTOR, INSTITUTE OF MARINE RESOURCES, SCRIPPS INSTITUTION OF OCEANOGRAPHY

Mr. Chairman and members of the committee, my name is Milner B. Schaefer. I am Professor of Oceanography in the Scripps Institution of Oceanography, and Director of the Universitywide Institute of Marine Resources, of the University of California. I have been engaged in scientific research, resources management, and other aspects of ocean affairs at the state, national and international levels during the past thirty-five years. Full details are given in my professional resume that I have already provided the Committee. In relation, however, to the topics I will discuss today, it may be useful to identify some pertinent experience. I was on leave of absence from the University of California from July 1967 through February 1969 to serve as Science Adviser to the Secretary of Interior.

I have served as a member of the NAS/NRC Committee on Oceanography (NASCO) from 1957 through 1967, and was its Chairman from 1964 through 1967, during which period the Committee produced its second comprehensive analysis of oceanography in the United States, in a publication entitled "Oceanography 1966—Achievements and Opportunities".

I presently serve on several panels of NASCO. My involvement with international oceanographic affairs includes experience on the scientific staffs of several of the International Fisheries Commissions to which the United States is a party, Director of Investigations of one of them (Inter-American Tropical Tuna Commission); service as an Expert on the Secretariat of the International Conference on Conservation of Living Resources of the Sea in Rome 1955; and service as an Expert on the Secretariat of the International Conference on the Law of the Sea in Geneva 1958; as well as professional involvement with a number of other aspects of international ocean affairs, as indicated in my résumé. While Science Adviser to the Secretary of Interior, I was a member of the U.S. delegation to the Working Group on Legal Questions Related to Scientific Investigation of the Ocean, of the Intergovernmental Oceanographic Commission, that met in Paris last September.

Mr. Chairman, it is self-evident that the report of the Commission on Marine Science, Engineering and Resources entitled "Our Nation and the Sea" is an important milestone in the development of oceanography in the United States. The Commission was particularly fortunate in including not only members of educational and research organizations, and of private industry engaged in marine affairs, but in also having the benefit of the wisdom and experience of members of both the House of Representatives and the Senate, as well as of the Executive Branch of the Federal Government. In consequence, this Report provides an excellent basis both for the actions that need to be taken by the Executive Branch, and for legislation and other action by the Congress, to make possible the expanded and accelerated activities in marine affairs that our nation requires to take full advantage of its opportunities in the World Ocean. The report contains so many excellent recommendations, and considers many aspects of marine affairs in such depth, that it is, of course, quite impossible for me to attempt to review it in its entirety. I may simply say that, in general, it is a magnificent report and the implementation of many of its recommendations should be undertaken as rapidly as possible. I wish to note this at the outset, because, with respect of some of the topics I wish to discuss today I do not completely agree with the recommendations of the Commission. Indeed, I have selected for comment some aspects of the Commission's report that are of importance, that I believe require some further consideration, and concerning which my comments may be of value to the members of your Committee.

I would like today, Mr. Chairman, to discuss three aspects of the report:

First, I would like to discuss the organization of the Federal Government with respect to civilian, mission-relevant ocean affairs.

Second, I will present my views concerning the urgent problem of freedom of scientific research and exploration of the sea, and means by which this problem might be resolved.

Third, I will speak on the subject of international affairs, and in particular the recommendations of the Commission concerning the regime of the seabeds in relation to other aspects of international ocean affairs.

Organization of the Federal Government for civilian mission-relevant oceanography

The appropriate organization of the Executive Branch of the Federal Government for dealing with ocean affairs, and some corresponding realignments in the Legislative Branch, is probably the most urgent matter with which the Commission, and your Committee, are concerned. As I am sure you gentlemen realize even better than I do, it isn't easy to decide just how to reorganize, or organize, or otherwise deal with our activities in the ocean, or in the ocean plus other elements of our natural environment.

The study of the Marine Commission is actually the most recent of a series of studies of this general problem.

The first of the studies that I would like briefly to recall is that of the National Academy of Sciences Committee on Oceanography (NASCO) that commenced in 1957 and was completed in 1959 with its report "Oceanography 1969-1970". This report analyzed in penetrating detail the national oceanography program, and came up with an extensive series of recommendations, but didn't really deal with the governmental structure. It considered the functions, the gaps, and what

needed to be done to upgrade and improve this nation's activities in the ocean.

Next, was the follow-on study of NASCO, and simultaneously there was being conducted a study by the Panel on Oceanography of the President's Scientific Advisory Council chaired by Dr. Gordon MacDonald. NASCO, in its second report "Oceanography 1966—Achievements and Opportunities", identified something like 33 different Federal bureaus and agencies involved with ocean affairs, as well as a number of Committees in the Congress, and pointed out that some kind of consolidation or restructuring of the organization is needed. This report of NASCO made no specific recommendations for reorganization; it indicated some of the ways in which a solution to the organizational problem might be approached. The MacDonald Panel of PSAC was actually the first to make specific recommendations on a new organizational structure. It proposed to meld together the federal functions concerning some aspects of the atmosphere and some aspects of the ocean, with some aspects of marine and terrestrial geology, all dealing very largely with the physical aspects of the environment, and largely left the biological aspects of the ocean out of its proposed new organization.

The Marine Commission has made its own very detailed study, and has found that the ocean is closely related to other parts of the planet, especially the atmosphere, in consequence of which its recommendations for reorganization would combine in the new National Oceanographic and Atmospheric Agency some aspects of atmospheric and oceanic affairs.

I am not convinced that the Marine Commission's recommendations are the best of the possible choices, and I will discuss possible alternatives that I believe to be better. However, before getting into this, I must emphasize that an important result of each of the several studies is the recognition that it would not be desirable to have one single agency to deal with all aspects of the ocean, including military uses, civilian uses, and basic science without regard to missions. All of the reports have essentially agreed that there need to be three separate, although coordinated, clusters of marine affairs in the United States. One of these includes military-related activities, or military oceanography, because the Navy has certain unique problems that cannot be very successfully combined with the nation's civilian, nonmilitary, mission-oriented problems. Second, basic research, the pursuit of information simply for the sake of understanding, and to provide a proper balance of the support of science directed to the elucidation of the nature of the world we live in, needs a separate home. Third, the scientific investigations, surveys, forecasting, resource-management activities, and other functions concerning our nonmilitary uses of the sea and its resources require a central focus. This is, of course, to some degree, an oversimplification, because some military-relevant activities have civilian applications, and it is also often difficult to distinguish between pure basic research and the foundations of engineering. It is, however, quite evident that what we didn't want is a "wet NASA" including all activities in a single agency, because we believe that that would not be most effective.

The important question, then, seems to be what civilian mission-relevant ocean activities should be combined within a single agency, and what, if any, aspects of the atmosphere and of the terrestrial environment should be included in the same agency. I note at the outset, Mr. Chairman, that in my opinion the ideal kind of organization would probably be that visualized by Dr. John Calhoun in his letter to you of 27 June 1969, in which he pointed out the desirability of establishing within the federal organization a Department of Natural Resources and Environments, which could bring into focus all federal policies and programs in these areas. He noted that major elements of such a unified department might be subdepartments of the ocean, of the atmosphere, and of terrestrial resource systems. I also agree with Dr. Calhoun, however, that such an ultimately desirable reorganization cannot be accomplished quickly, that, meanwhile, there is an urgent need to provide a focus for ocean resources, and that this cannot afford to wait upon the broader goal. The question seems to be, then, what is the most appropriate way to cluster the civilian mission-relevant marine activities of the Federal establishment so as to get on with our understanding and use of the marine environment, while the broader problem of how we might most appropriately combine all aspects of natural resources and environments into a single agency is being deliberated.

One way of examining this problem is to consider the functions that need to be performed in both ocean and atmosphere, and see how the proposed NOAA corresponds to them. I will review this only briefly, because I presented a fairly detailed analysis at a Seminar on "A Critical Review of the Marine Science

Commission Report" in January 1969, and the Proceedings of that Seminar have been published by the George Washington University. I would note, Mr. Chairman, that the Seminar was organized by Professor Thomas A. Clingen, and I am extremely pleased to observe that he is now the very able Counsel of your Subcommittee.

I believe that the functions fall naturally into four categories: First the support of scientific research and exploration, that is the study of processes, discovery of new phenomena and the discovery of new resources. This kind of research may be highly applied, or it may be quite basic, but it is oriented to the exploration of the unknown, the discovery of new phenomena, and obtaining new understanding. Second, according to my classification, is the function of surveying, mapping, charting, monitoring, and forecasting. This is essentially the environmental and scientific service function to give guidance to government and industry. This is what ESSA does in the atmosphere, and partly in the ocean through the Coast and Geodetic Survey, although the Coast Guard and some branches of the Bureau of Commercial Fisheries, as well as some other agencies, are also involved in such functions in the ocean. The third category of functions constitutes man's intervention in the system. This involves what we do by way of environmental modification, and resources management, on the basis of the surveys, and forecasts, and the knowledge of processes provided by scientific research. In the atmosphere, there are really only two important ways that we are concerned with intervention or management:

(1) The prevention or abatement of air pollution, which is at the present time the responsibility of HEW.

(2) Intervention in meteorological processes to modify the weather; responsibility for this now resides in several agencies, including ESSA, the Department of Agriculture, and the Department of the Interior. The fourth category of functions is engineering development, that is the development of new technology, and new ways of doing things, so that we can operate in the environment more effectively for any of the other purposes—scientific research, or survey monitoring and forecasting, or management and intervention—as well as for the actual use of the environment and its resources by enterprise. This function of engineering development, with respect of both the ocean and the atmosphere, is widely scattered at the present time, as has been observed by the Marine Commission, by NASCO, and by other study groups.

Remembering these four categories of functions, we may then look at what the Marine Commission recommends for the organization and functions of the NOAA, commencing at page 230 of its report. On pages 230 and 231 are listed 18 specific functions of the proposed new agency. To discharge these functions there would be assigned to NOAA, by this scheme, the Coast Guard, ESSA (which includes the Weather Bureau, the Coast and Geodetic Survey, and some other entities), the Bureau of Commercial Fisheries plus the marine and anadromous fisheries functions of the Bureau of Sports Fisheries and Wildlife, the National Sea Grant Program from NSF, the United States Lake Survey (the part of the U.S. Corps of Engineers concerned with work in the Great Lakes), and the National Oceanographic Data Center. The Antarctic Research Program and the National Center for Atmospheric Research of NSF are also recommended for inclusion in NOAA but are "not immediate priority". There would also be established within the new agency new programs involved with fundamental marine engineering and technology, and with environmental modification, new means of supporting university scientific research institutionally through a system of national laboratories and coastal zone laboratories, and provision of a system of grants to states for coastal zone management.

Some of the atmospheric and oceanic functions, then, would remain outside the new organization. It is pointed out, for example, that NASA's work in oceanography and space should stay where it is and AEC's marine-related nuclear energy program should stay where it is. With respect to some of the activities of National Science Foundation, the Corps of Engineers (especially the coastal engineering research function), and the marine components of the Geological Survey and of the Federal Water Pollution Control Administration, the recommendations are not entirely clear. These agencies are not transferred, but many of the functions that they perform would become part of the responsibility of the new organization, according to the list of recommendations of the Marine Commission.

Looking at this package in a perhaps simplified way, it appears to me that the new organization would be particularly strong in the second and fourth categories of functions, according to my taxonomy. It would be very strong in surveying, mapping, monitoring and forecasting, that is in providing necessary services to government, industry and other organizations. However, with respect to this function there remain numerous problems in organizational structure, because some other organizations that do a good deal of marine surveying, mapping and forecasting are excluded, including the Geological Survey, the Federal Water Pollution Control Administration, and the Coastal Engineering Laboratories of the Army Engineers.

NOAA would also be particularly strong in having a new purpose in the development of fundamental engineering and technology. This is obviously one of the areas where there needs to be some new and better ways of doing things, but one does encounter questions in the case of both the atmosphere and the ocean, such as: what about the work that NASA and FAA are engaged in? In the marine area, what do we do about engineering development work that is being pursued by FWPCA, the Maritime Administration, the Corps of Engineers, and the Bureau of Mines?

The weakest area of the new NOAA would be with respect to the function of resources management and intervention in the environment, since the only complete transfer of existing responsibility to the new agency seems to be in the area of living resources. NOAA would take over essentially all the management functions of the Federal Government related to fisheries resources, since, for these resources, it would have all civilian mission-oriented functions, including basic mission-relevant research, survey and monitoring, intervention and management. It would, in this respect, be advantageous in that it would closely couple the activities both in the atmosphere and ocean related to living resources. Thus, we who are particularly concerned with fisheries, would have the best of both worlds. I am not convinced, however, considering the importance of other marine resources and other kinds of interventions in the environment, such as the management of petroleum and mineral resources on the outer continental shelf, or the prevention and control of marine pollution, or the maintenance of beaches and harbors, or the subject of ocean transportation, or the matter of recreation, that this is the optimum solution.

NOAA would have responsibility for a good deal of the research, exploration, survey and forecasting that the presently responsible resources-management agencies need as a basis of the management missions.

Consequently, one needs seriously to ask whether it would be better to couple more closely all the functions concerning civilian uses of the sea, even though some have important connections with the atmosphere, rather than having a close coupling of certain aspects of sea and atmosphere, but leaving much of the function of resource management and environmental intervention outside the new agency.

While I agree with Dr. Calhoun, and others, that the creation of NOAA would be better than maintaining the status quo, I also agree with him that a different kind of organization would be more desirable.

I personally believe that it would be highly desirable to concentrate in a single agency all the various functions having to do with civilian uses of the ocean environment and ocean resources, leaving the coupling with atmospheric affairs more loose. In other words, I would like to see the marine functions of the various Bureaus and Offices of the Department of Interior, the maritime functions of ESSA, the marine functions of the Department of Transportation, including both the Coast Guard and the Maritime Administration, the coastal research and engineering functions of the Army Engineers, and the Sea Grant College Program of the National Science Foundation, all placed in a single agency, together with the new initiatives for advancement of ocean technology and engineering, the institutional support of university scientific research, the national projects, and grants to states for coastal zone management. I also believe that serious consideration should be given to transferring the primary responsibility for the International Fisheries Commissions to this new agency; this, however, is contingent upon an appropriate realignment of the Congressional Committees dealing with marine affairs, since the principal handicap to the activities of the International Fisheries Commissions, appears to be not so much in the Executive Branch as in the Legislative Branch of our Government.

By combining all of these various functions into a single agency, and developing an integrated program and adequate budget for it, I sincerely believe that

the United States would be able to make the rapid strides toward mastery of the ocean and its uses with which we have all been so much concerned.

Another important question, of course, is whether this should be accomplished through combining these activities in some existing agency, or through establishing a new, independent agency. The existing agency of the United States Government that would be the logical place to center these functions is the Department of Interior, since the Department of Interior is, essentially, the United States' Department of Natural Resources. Indeed, if some of the functions of that Department, such as the Bureau of Indian Affairs and the Office of Trust Territories, were placed elsewhere, and various natural resources and environmental functions in other Departments were transferred to Interior, it might very well be transformed into the Department of Natural Resources and Environments envisaged by Dr. Calhoun. I do not, however, see this complex reorganization coming about in the foreseeable future.

Placing the various marine activities I have enumerated above in the Department of Interior would have some obvious organizational advantages. But, offsetting this, is the fact that that Department would still be primarily land-oriented. For the reasons already elucidated by the Marine Commission, and the reasons given by Dr. Calhoun in his letter of 27 June to you, I also believe that an independent agency for ocean affairs is required, so that its mission will not be subordinated to any existing departmental missions, so that Congress can provide a special over-view of the program apart from existing departmental structures, and so that ocean affairs will attain large public visibility and draw strong public interest and support. If we are to progress rapidly and effectively with our mastery of the ocean and its resources for the benefit of our citizens and for all mankind, it is important that the new Ocean Agency have sufficient coherence of missions, sufficient identity, and sufficient strength to attract the necessary support both within the Executive Branch and Legislative Branch of our Government.

Freedom of scientific research and exploration of the sea

Mr. Chairman, our advances in ocean science and technology have created a unique paradox. During the last two decades, expanded programs of ocean research both in the United States and elsewhere in the world have enabled sea-going scientists to obtain the facilities, equipment and capabilities to investigate large-scale problems in fundamental oceanography, and concerning the resources of the sea, that were formerly beyond our capacity. I am sure you are aware of the far-ranging expeditions and observational systems, and the coordinated participation of scientists of various disciplines, that are required for these important oceanographic investigations. At the same time, however, the advances in science and technology that have made such comprehensive studies possible have also increased the capabilities of nations to utilize the ocean's resources more fully, not only close to their shores but far offshore. In consequence, there is a recent spate of extended claims for expanded jurisdictions, or new jurisdictions, in waters adjacent to the coasts of many nations. This further hampers freedom of scientific research and exploration. The scientific progress that is the necessary basis for full utilization of ocean resources is being choked by the new regimes men establish because of such enhanced capability for resource use.

Recognizing this problem, the Marine Commission has devoted a section of its report, commencing at page 201, to it, and to recommendations toward its solution.

The recent deterioration of freedom of scientific research and exploration commenced with the preparations for and the negotiation of the Conventions on the Law of the Sea at Geneva in 1958. It was most unfortunate, for example, that the International Law Commission, and the International Conference, did not see fit to include scientific research explicitly as one of the freedoms enumerated in the Convention on the High Seas, even though the International Law Commission's discussion, and the debates at Geneva in 1958, made it abundantly clear that it is one of the recognized freedoms. Even more unfortunate was the inclusion in the Convention on the Continental Shelf of paragraph 8 of article 5, requiring the consent of the coastal state with respect of any research concerning the continental shelf and undertaken there, that, in practice, has tended to negate the provision in paragraph 1 of the same article that:

The exploration of the continental shelf and the exploitation of its natural resources must not result . . . in any interference with fundamental oceanographic or other scientific research carried out with the intention of ocean publication.

This restrictive provision was adopted, despite strong representations from the scientific community, and the urging of some states, with the full support of the United States. I believe this was a great mistake, and the sooner we rectify it the better both for the sake of our own welfare, and that of mankind in general. I will not attempt here a review of the problem, because it is covered rather well, although briefly, in the Commission's report. I have also provided for the background information of your Committee two more detailed studies of the problem that I have recently prepared. I would, however, like to call special attention to the activities of a Working Group of the Intergovernmental Oceanographic Commission (IOC) on Legal Questions Related to Scientific Investigations of the Ocean that, with the full support, and leadership, of the United States, has recommended to the IOC that it adopt a resolution that could provide one means of resolving many problems of freedom of access in all, or nearly all, parts of the sea required for scientific research and exploration. It would establish a system whereby the Intergovernmental Oceanographic Commission would assist in rapidly facilitating the consent of its States members for scientific research in ocean areas over which they exercise jurisdiction.

Under this system permission would be granted for conducting research subject to the following provisions:

- (1) Notice of the research program should be given at least sixty days in advance.

- (2) The coastal State should have an opportunity to participate in the research program by at least one representative aboard the research vessel.

- (3) Data from the research program will, upon request, be made available as soon as practicable to the coastal State, and any data or samples not feasible to duplicate will, upon request, be made accessible to the coastal State.

- (4) The results of the research program will be published in a timely fashion in open scientific publications.

It may be noted that these provisions are rather similar to those embodied in the Marine Commission's recommendation for a new Convention on Freedom of Scientific Research, that the United States is urged to take the initiative in proposing.

The Marine Commission has recognized, quite correctly, that the adoption of a new international convention is a time consuming process, and is not likely to be accomplished in the near future. In consequence, the Marine Commission has recommended that the United States seek to enter into bilateral and regional agreements embodying the recommended provisions for the new Convention, and take other initiatives to encourage freedom of scientific research and international scientific cooperation. I most strongly support this position, and urge both the Executive and Legislative Branches of our Government to take vigorous action in this regard. In addition to making bilateral and regional agreements, it will, in my opinion, be extremely useful and effective if we also act unilaterally in this matter. The Commission has recommended, for example, that:

The United States might announce unilaterally that, upon proper notice, it will consent to the conduct in its territorial waters and exclusive fisheries zones of scientific research (including the limited taking of fish specimens) which is a part of an international cooperative project sponsored or endorsed by the IOC, provided that it may participate or be represented in the research and that the scientists involved agree to publish the results of the research and to make available upon request the basic data acquired.

I strongly endorse this. I go even further, to urge the United States to announce, unilaterally, that it is prepared to permit the research vessels of any nation, upon certification by that sovereign, to undertake scientific and exploratory activities in the waters, and on the seabed, under the jurisdiction of the United States, subject only to the conditions respecting advance notice, participation in the activities (including free access to all equipment, compartments, devices, and records on the ship); access to and copies of all data obtained; and subsequent access to specimens collected. I am confident that under these circumstances we would have nothing to fear from the activities of vessels carrying on scientific research, and even resources exploration, in our waters, because to the extent other nations carried on such activities with our participation we would be getting for free a lot of information that we would have to pay for if we did it ourselves. At the same time, it would be an excellent demonstration that this is the best policy for all nations, including the underdeveloped nations that are so fearful of the great powers stealing their marine resources, because it is an excellent way to obtain the information about the environment and resources that they require for their own welfare.

It is specifically to be noted that I do not advocate attempting to distinguish among fundamental scientific investigation, commercial exploration, or military intelligence. The same kind of vessel, with exactly the same kind of equipment, taking exactly the same kind of observations can be engaged in any or all of these activities. The only way of distinguishing would be the intent of the operators, and I submit that intent is impossible to determine. I believe that the important operational distinction is whether the people aboard the vessel, regardless of their intended use of the data, are willing to have representatives of the coastal State participate fully in the activities, have complete access to all equipment, devices, facilities and records aboard the vessel, and have copies of all of the information obtained, and access to specimens collected. If these conditions are satisfied, I believe we have nothing to fear, regardless of the purpose to which the people gathering the data may put it.

I strongly urge that both the Executive and Legislative Branches of our Government take the leadership, as recommended by the Commission, in resolving this important problem.

International affairs

As I indicated at the outset of my testimony, Mr. Chairman, I have been engaged in international marine affairs in a variety of contexts for a great many years. In my opinion, the treatment of international marine affairs, especially in Chapter 4 under Marine Resources, is the weakest part of the report of the Marine Commission.

The treatment of international fisheries management is naive, incomplete, and in some respects internally inconsistent. I shall not, however, go into this, because I am sure it will be fully treated by others appearing before you.

The Marine Commission has placed most of its emphasis concerning the international legal political framework on detailed discussion of, and recommendations concerning, the extent of national jurisdiction over the seabed, and on recommendations for a new regime for the seabed beyond national jurisdiction. Again, I shall not go into this in detail, although I disagree with a number of the proposals of the Commission in this regard. For example, while I agree that it is desirable, and perhaps essential, firmly to establish the outer geographical boundary of the jurisdiction of the coastal State over the resources of the seabed, I believe that such a boundary should most appropriately be located at or near the outer boundary of the continental margin, rather than the much narrower zone of the coastal State jurisdiction advocated by the Marine Commission. In consequence, of course, I also disagree with the necessity, or desirability, of the proposed intermediate zone. Finally, so far as the resources of the deep-sea floor, beyond the continental margin, are concerned, there seems to me to be no pressing necessity for the establishment of any new regime at this time. I strongly believe that the present regime of the high seas is quite adequate for the initial stages of exploration and utilization of the sea-bed resources of this region, and should be followed until we have a better basis in experience for establishing any new regime for this region of the sea floor.

However, my major concern with the deficiency of the report of the Marine Commission with respect of international legal issues is not because of disagreement with these particular recommendations, but because I do not believe that the Marine Commission gave adequate attention to other aspects of the public order of the oceans. Concentration, to the apparent exclusion of almost everything else, on the regime of the seabed may be extremely dangerous to the welfare of the United States. I should like to recall, Mr. Chairman, that our previous experience has been that it is impossible to select one aspect of the international regime of the sea for separate international negotiation and agreement. All of our experience from 1950 through 1958 in preparing for, and carrying out, the International Conference on the Law of the Sea indicated that the international law of the sea is such a complex, interrelated whole that one cannot successfully deal with one aspect without taking into account all other aspects. The failure of the Conference in 1960 called to deal with the important issue, unresolved at the 1958 Conference, of the breadth of the territorial sea, reinforced this view. I submit also that our recent experience in the General Assembly of the United Nations, in its *ad hoc* Committee on the Seabed, and the present Standing Committee on the Seabed, illustrates once again that one cannot deal with seabed issues independently of other issues.

I am, therefore, concerned because the present activity of the United States, which seems to be leading toward the early convening of an international conference to consider the seabeds issues, will almost certainly result in many other

issues being brought before such a conference. Professor William Burke, at a recent seminar at the University of Oregon, has pointed out that it would be only prudent to inquire what other issues will be considered, and how these issues might have to be adjusted in order to secure the kind of agreement we might seek concerning the seabeds. At this symposium at the University of Oregon, Professor Burke said:

It certainly is not at all beyond anticipation that there will be a strong move by some states, perhaps a large number: (1) to secure agreement on a wide territorial sea; (2) to make it entirely clear (as it is not now) that warships do not enjoy a right of innocent passage through the territorial sea; (3) to assure exclusive fishing rights in a wide fishing zone as a possible alternative to a territorial sea of a particularly wide sort; (4) to establish new and more severe restrictions upon the conduct of scientific research; and (5) to place special restraints on military uses of the seabed, the water column and the surface.

As Professor Burke pointed out, in the proper exercise of prudence the United States, as well as other nations, needs to examine in some detail how its interests are affected by alternative dispositions of these issues. There is no evidence from the report of the Marine Commission, or the reports of its panels, that these other aspects of the international public order of the oceans were considered, and that is what greatly disturbs me. I would hope that these would be considered in some detail before we charge ahead on the seabeds issue.

Dr. SCHAEFER. As I have noted in the statement, I have served for quite some time on the National Academy of Science Committee on Oceanography, commonly known as NASCO, and I had the privilege of being its chairman during the period when we prepared our second comprehensive report, that is, "Oceanography 1966—Achievements and Opportunities."

I have been involved with international affairs for some time. In fact, I started out with the International Halibut Commission headquartered at the University of Washington under Dr. W. F. Thompson, and then worked for the International Pacific Salmon Fisheries Commission concerned with the salmon of the Fraser River, and had the pleasure of being director of the Inter-American Tropical Tuna Commission for a number of years. I was involved in the development of the Law of the Sea Conferences that were held in Geneva in 1958 and 1960. Most recently, in addition to my university activities, I have served as Secretary Udall's science adviser from mid-1967 through the spring of 1969.

Not included in the résumé is that I also have a few industrial connections. There is a small company called Fishing Technology, Inc., of which I am vice president. We are in the business of trying to apply some of the things we have learned about the science of the sea to catching tuna a little more efficiently, and I am involved together with Dr. Spilhaus in a new venture called Aqua International. We think we have some ideas for getting lobsters and one thing and another, out of the water a little more efficiently. However, I don't hold forth as an expert in these industrial affairs, but I wanted to tell you this to make the résumé complete.

Mr. Chairman, it is very evident that the report of the Commission on Marine Science, Engineering, and Resources is a very important milestone in the development of oceanography in the United States, and I regard it as particularly fortunate that this Commission included not only experts from the educational and research organizations and industry, but also had the benefit of the wisdom of representatives both of the legislative and executive branches of the Federal Government.

I think this report is an excellent basis for actions that need to be taken by the executive branch, and for legislation and other actions by the Congress, to make possible the necessary expansion of activities in marine affairs that our Nation obviously requires if we are going to take full advantage of our opportunities in the ocean.

This report has so many excellent recommendations, and covers so many aspects of marine affairs in so much depth, that it is certainly not possible to attempt to review the entire report. I do think it is a magnificent report, and the implementation of many of its recommendations should be undertaken with all possible speed.

I want to point this out at the outset, because some of the topics that I am going to discuss today, are in areas where I don't completely agree with the recommendations of the Commission.

In fact, I have selected for comment some aspects of the Commission's report which are of importance, that I think need some further consideration, and concerning which my comments may be of some utility.

I would like, therefore, to cover three aspects of the report. First, I would discuss the organization of the Federal Government with respect to civilian, mission-relevant ocean affairs.

Secondly, I would like to present some views concerning the very urgent problem of freedom of scientific research and exploration of the sea, and means by which this problem, that is becoming rapidly exacerbated, might be resolved.

Thirdly, I would like to speak to the topic of international affairs, and in particular the recommendations of the Commission concerning the regime of the seabeds in relation to some other aspects of our Nation's international ocean affairs.

So far as the organization of the Federal Government for civilian, mission-relevant oceanography is concerned, this has been studied by a number of different groups for quite a number of years, as I am sure you are even more aware than I am. This study of the Marine Commission is the most recent of the series.

The first study was that of the National Academy of Sciences' Committee on Oceanography (NASCO), that started in 1957 and was published in 1959 as a report called "Oceanography 1960-1970." This report analyzed the organization of the Federal Government but didn't make any recommendations for reorganization.

Next, there was a follow-on study by NASCO, during the period when I was privileged to be its chairman, and simultaneously the President's Scientific Advisory Council had a panel on oceanography chaired by Dr. Gordon MacDonald.

NASCO in its second report again identified the many agencies, some 33, that are involved in ocean affairs in the executive branch of our Government, and pointed out that some consolidation and restructuring was needed, but didn't attempt to make specific recommendations for reorganization.

The MacDonald panel, on the other hand, did make some specific recommendations on a new structure. It proposed to put together the Federal functions concerning, primarily, matters of ocean survey, monitoring, forecasting, and some aspects of intervention in the ocean environment, combining those with similar activities in the atmos-

phere, and with some aspects of terrestrial geology, and of ocean resource management and development.

With the exception of the fisheries, however, the functions of the new agency dealt very largely with the physical aspects of the environment, and left the biological aspects out of the proposed new organization.

The Marine Commission has made its own detailed study. Again it has found that the ocean is closely related to other parts of the planet, especially the atmosphere, and has recommended, in its reorganization, to combine in a National Oceanographic and Atmospheric Agency some of the aspects of both atmospheric and oceanic affairs.

I am not convinced that this is the best possible choice, and I will discuss some alternatives. However, I would like to point out one thing: That each of these studies recognize that it would not be desirable to have a single agency to deal with all aspects of the ocean including military uses, civilian uses, and basic science. In other words, I think what none of us are in favor of is "a wet NASA." In general, the consensus seems to be that we need essentially three clusters of organizations. That is, we need the military oceanography in the Defense Department. Secondly, we certainly need to support many aspects of basic research, those that have no regard to particular missions, and those that are necessary to provide a rounded balance of basic science for the purpose of understanding the world we live in. And, thirdly, we need some kind of a better agglomeration of activities related to the uses of the oceans for civilian purposes, including all of the research, monitoring, forecasting, and so on that this requires.

The difference of opinion seems to be in what should go into this third category.

I would note at the outset, Mr. Chairman, that in my opinion, the ideal kind of organization would probably be the one that was visualized by Dr. John Calhoun in a letter to Chairman Lennon of June 27, 1969. In that letter he pointed out the desirability of establishing some kind of a Department of Natural Resources and Environments that would bring into focus all Federal policies and programs in these two broad areas.

I also agree, however, with Dr. Calhoun that, while this is ultimately desirable, such a massive reorganization can't be accomplished very quickly, and that meanwhile there is an urgent need to provide a focus for ocean research.

The question is then what things should be combined in the ocean resources and environments cluster.

One way of examining this problem is to consider the functions that need to be performed in the ocean, and in the atmosphere, and see how the proposed NOAA corresponds. I made a fairly detailed analysis of this problem in a seminar that was organized by your very able counsel, Tom Clingan, when he was professor at George Washington University, and the proceedings of that seminar have been published by the George Washington University so that I won't go into detail on this.

However, it is evident that these functions fall into four categories rather naturally. First is the support of scientific research and ex-

ploration; that is, the study of processes, and the discovery of new phenomena, and the discovery of new resources.

Second is the function of surveying, mapping, charting, monitoring and forecasting. This is essentially the environmental and scientific service function, to provide the information and guidance that is required by Government and industry for all of their activities in the ocean. This is what ESSA does in the atmosphere, and partly in the oceans through the Coast and Geodetic Survey, but there are a number of other agencies also involved in this business in the ocean.

The third category of functions is intervention in the system. This essentially involves what we do by way of modifying the environment, and managing the resources, on the basis of the surveys, the forecasts, and the scientific research.

In the atmosphere this third category is fairly simple, since there are only two important ways that we intervene. One of them is in the matter of air pollution, which is now the responsibility of HEW, and the other is in weather modification, which is now the responsibility of several agencies.

Conversely, in the ocean, the ways in which man is involved in modifying the environment, and in managing and developing the many resources, is much more complex, and the responsibilities reside presently in a large number of agencies.

The fourth category of functions is engineering development; that is the development of new technology, new ways of doing things so that we can operate in the environment more effectively for any of the other purposes.

If one remembers these categories of functions, and then looks at what the Marine Commission recommends for the organization and functions of NOAA, commencing at page 230 of the report, it will be seen that they list 18 specific, detailed functions for the proposed new agency, and to discharge these functions they propose an aggregation including the Coast Guard, ESSA, Bureau of Commercial Fisheries, plus some of the marine and anadromous fisheries functions of the Bureau of Sports Fisheries and Wildlife, the National Sea Grant program from NSF, the U.S. Lake Survey, which is part of the U.S. Corps of Engineers concerned with work in the Great Lakes, and the National Oceanographic Data Center.

They also note in passing that the Antarctic Research Program and the National Center for Atmospheric Research, of NSF, might be included in NOAA, but are not of immediate priority.

Comparing the things that are outlined in the Marine Commission's report with the categories of functions I have discussed, it appears to me that the proposed new organization would be very strong in the second and fourth categories of functions.

That is it would be very strong in the area of surveying, mapping, monitoring and forecasting; providing these services to government and industry. However, with respect to this function there remain considerable problems in organizational structure, because some other organizations do a great deal of marine surveying, mapping, and forecasting, and they are excluded. These include such organizations as the Geological Survey, Federal Water Pollution Control Administration, and the Coastal Engineering Laboratories of the Army Engineers.

NOAA would also be very strong in having a new purpose in the

development of fundamental engineering technology. I agree that this is one of the areas that really needs to be beefed up, and the recommendations of the Commission are very useful in this regard. One does encounter, however, the question, in both the atmosphere and the ocean, of how one splits off what this new group does from what NASA and FAA are doing on the atmospheric side, and what is being done by FWPCA, Maritime Administration, Corps of Engineers, Bureau of Mines, and so on, on the ocean side. But in general I think the recommendations would greatly strengthen this area that needs beefing up.

Perhaps the weakest aspect of the new NOAA would be with respect to the function of resource management and intervention in the environment.

It seems to me that the only complete transfer of existing responsibility to the new agency is in the area of living resources. In this case NOAA would take over all of the living marine resource functions from the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife. I should note that us folks who are concerned with fisheries would actually have the best of both worlds with this new organization, because we would have all of the fisheries-relevant matters in one agency, and would have also the advantage of having in the same agency the air-sea interaction research and services helping to predict our fisheries. So from that standpoint I suppose I ought to be for it.

However, I am not convinced, considering the importance of all the marine resources and various kinds of intervention in the environment, including such things as managing of petroleum and mineral resources on the outer continental shelf, or the problem of prevention and control of marine pollution, or beach and harbor maintenance, or ocean transportation, or recreation, that this would be the optimum solution for the Nation as a whole.

NOAA, under the proposed scheme, would have the responsibility for a good deal of the research, exploration, survey and forecasting that the present resource-management agencies need, but the management responsibility would lie within those other agencies. I think this needs very careful consideration.

So, I think one needs to ask whether it would be better to couple closely all of the functions concerning civilian uses of the ocean, even though some of them have important connections with the atmosphere, leaving the atmosphere sciences less closely coupled, rather than having a close coupling of certain aspects of sea and atmosphere, but leaving some of the functions of ocean resources management and environmental intervention outside.

I will say that I agree with Dr. Calhoun and others who have testified to this committee and written to the chairman, that creation of NOAA would be better than leaving everything the way it is now, but I also agree with them that a different kind of organization would be perhaps more desirable.

My personal belief is that it would be very desirable to concentrate in a single agency all of the functions having to do with civilian uses of the ocean environment and ocean resources, and leave the coupling with atmospheric affairs a little more loose.

In other words, the kind of aggregation I would hope you might consider is taking the marine functions of all of the various bureaus and

offices of the Department of the Interior, the maritime functions of ESSA, the marine functions of the Department of Transportation, including both Coast Guard and Maritime Administration, the coastal research and engineering functions of the Army Engineers, and the Sea Grant program of the National Science Foundation, and putting them all in a single agency, together with the new initiatives for advancement of ocean technology, the institutional support of relevant university scientific research, the national projects, and the grants to the States for coastal zone management.

I also believe that one thing that wasn't dealt with by the commission's report that ought to be thought about is transferring the primary responsibility for the International Fisheries Commissions from the State Department to this new agency. This, however, is contingent on some appropriate alignment of the congressional committees, and particularly within the Appropriations Committees, with respect to marine affairs, because the big problem with the International Fisheries Commissions appears to be more in the legislative branch than in the executive branch of the Government.

I sincerely believe that a new agency of this sort might enable us to make the rapid strides toward the mastery of the ocean and its uses that we have all been concerned with for so many years, and that we hope to get on with.

A companion question, of course, is whether this should be accomplished through putting all of these activities in some existing agency, or by establishing a new, independent agency.

Quite obviously the existing agency of our Government, that would be the logical place to center these functions, is the Department of the Interior, since it is essentially our department of natural resources. Indeed, if it were possible to slough off the Bureau of Indian Affairs and the Office of Trust Territories, and a few other things, and then put various natural resources and the environmental functions of other departments into Interior, it might very well be transformed into the department envisaged by Dr. Calhoun.

However, I don't see this kind of complex reorganization coming about very fast. Also, while it would have some obvious organizational advantages, offsetting this would be some disadvantages. One of them is that the department itself would remain primarily land oriented. And, more important, I believe that an independent ocean agency is required so that its mission won't be subordinated to any other missions, so that the Congress can provide a special overview of the ocean program apart from existing departmental structures, and so that ocean affairs will attain large public visibility and draw strong public interest and support.

The second topic I would like to speak to briefly, Mr. Chairman, is the matter of freedom of scientific research and exploration of the sea.

Our recent advances, during the last two decades, have created a sort of unique paradox. During the last two decades, both in the United States and elsewhere, the seagoing scientists have been able to obtain a lot of new facilities and equipment and capabilities to investigate the ocean on a large scale, to find out a great deal about the resources of the sea, and to obtain other knowledge that was formerly beyond their capacity.

At the same time, these advances in science and technology have also increased the capabilities of nations to use the oceans' resources more fully—to drill for petroleum in deep water and perhaps even to mine the mineral resources of the deep sea floor, about which I understand you will hear more tomorrow, to fish further offshore and catch much larger quantities.

In consequence of this, there has been a recent spate of extended claims for expanded jurisdictions, or the establishment of new jurisdictions, in water adjacent to the coasts of many nations.

This of course hampers the freedom of scientific research and exploration. So the goose that is laying the golden eggs is in the process of strangling itself.

I want to commend the Marine Commission in this report, because in the section of its report, commencing at page 201, it has devoted considerable attention to this problem and to some recommendations toward its solution.

The history is moderately well covered in that report, and I have also submitted to your counsel a couple of studies that I have recently done on the subject, that give a great deal of detail on the historical background of the growth of this problem and proposals to deal with it, so I won't go into much detail here.

I would recall, however, that the deterioration commenced during the preparations for, and the negotiation of, the Conventions on the Law of the Sea that were adopted in Geneva in 1958. It was quite unfortunate that the International Law Commission and the International Conference itself did not see fit explicitly to designate scientific research as one of the freedoms of the high seas, even though it was recognized as being one of them.

Most unfortunate was the inclusion in the convention on the Continental Shelf of paragraph 8 of article 5, which requires the consent of the coastal State with respect of any research concerning the Continental Shelf undertaken there. Although this was supposed to be exercised only in exceptional circumstances, that is, a refusal was only to be given in exceptional circumstances, in practice it has tended completely to negate the provision of paragraph 1 of the same article that provides that there shall be no "interference with fundamental oceanographic or other scientific research carried out with the intention of open publication."

This restrictive provision was adopted, despite very strong recommendations from the scientific community, with the full urging and support of the United States. I believe this was a great mistake on our part, and the sooner we rectify it, the better it will be for our own national welfare and for mankind in general.

I would like to call attention, in addition to the detailed studies I referred to earlier, to the activities of a working group of the Intergovernmental Oceanographic Commission on Legal Questions Related to Scientific Investigations of the Ocean. In this case, with the full support and leadership of the United States, there has been recommended to the to the Intergovernmental Oceanographic Commission that it adopt a resolution that might provide one means of resolving many problems of freedom of access in all, or most, parts of the sea that we scientists require access to for our scientific research and exploration. This would establish a system whereby the IOC would assist in facili-

tating consent of States members subject to only the following important provisions: First, 60 days' advance notice; secondly, provision that the coastal State shall have an opportunity to participate in the research program; thirdly, that all of the data would, upon request, be made available to the coastal State, and samples that are not feasible to duplicate would be made accessible; and, finally, that the results of the research would be published in a timely fashion in the open scientific literature.

These are very similar to the provisions embodied in the Marine Commission's recommendations for a new convention on freedom of scientific research. The Marine Commission recognized, quite properly I think, that the adoption of a new international convention is a very time-consuming process, and in consequence recommended, and I fully concur, that the United States should seek to enter into bilateral and regional agreements embodying the recommended provisions for the new convention, and also to take such other initiatives as possible to encourage freedom of scientific research and international scientific cooperation.

I most strongly support this position, and particularly the recommendation, that, in addition to proceeding with bilateral and regional agreements, we go ahead and act unilaterally in this matter. The Commission has made a recommendation in this regard that is quoted on page 21 of my statement, so I won't read it, which I strongly endorse.

I would go a bit further, however, and urge the United States simply to announce unilaterally that it is prepared to permit the research vessel of any nation, upon certification by its sovereign, to undertake scientific and exploratory activities in our waters, and on the seabed under our jurisdiction, subject only to the conditions respecting advance notice; participation in the activities, which of course needs to include free access to all equipment, compartments, devices, and records that are aboard the ship; access to and copies of all data obtained; and access to specimens collected.

I am quite confident that under these circumstances we would have nothing to fear from the activities of vessels carrying on operations close to our coasts, even though they included resource exploration, because, to the extent other nations carry on research or exploratory activities, where we participate and get all the information along with them, we would be getting for free a lot of information we would have to pay for if we did the work ourselves.

At the same time, it would be an excellent demonstration that this is the best policy for all nations, including the underdeveloped nations that presently seem to be afraid that the great powers are going to rob them of their marine patrimony, because it is an excellent way to obtain the information about the environment and the resources that they themselves require for their own welfare.

I would like to point out, specifically, that I don't advocate trying to distinguish among fundamental scientific investigations, commercial exploration, and military intelligence. I think this is a fruitless exercise, because the same kind of vessel with exactly the same kind of equipment, taking exactly the same kind of observations can be engaged in any of these activities. The only way of distinguishing would be the intent of the operators, and I believe that intent is very difficult to determine. I believe the important operational distinction is whether

the folks aboard the vessel, regardless of their intended use of the data, are willing to have the work all done openly, with full access of the representatives of the coastal State to everything that is going on.

If these conditions are satisfied, I believe that, particularly, a country like ours, with advanced scientific knowledge and technology has nothing to fear regardless of the purpose for which the people gathering the data may be taking it.

I strongly urge, therefore, that both the executive and legislative branches take the leadership recommended by the Commission in resolving this very important problem, which is becoming increasingly a burdensome handicap to the scientific community, as well as to some branches of our industry, that are attempting to explore the oceans for research purposes.

The third topic I would like to speak about very briefly, sir, is the matter of international affairs.

In my opinion the treatment of international affairs, especially that in chapter 4 under Marine Resources, is the weakest part of the report of the Marine Commission. The treatment of international fisheries management in that section, and in the panel report, is, in my opinion, sir, naive, incomplete and in some respects internally inconsistent.

I won't go into this in detail, because I am sure it will be fully treated by others appearing before you, and there was a fairly long discussion of this at the recent Law of the Sea Institute at the University of Rhode Island, the proceedings of which are available.

The Marine Commission, however, has placed most of its emphasis concerning the international legal political framework on a detailed discussion of, and recommendations concerning, national jurisdiction over the seabed, and recommendations for a new regime for the seabed beyond national jurisdiction.

Again I shan't go into this in detail, although I disagree with a number of the proposals of the Commission in this regard, of which I have in my statement given some examples. For one example, I believe it is desirable and essential to establish an outer geographic boundary of the jurisdiction of a coastal state over the resources of the seabed, but I don't agree with the Commission's recommendation on where this boundary should be.

However, my major concern with the report of the Marine Commission with respect to international legal issues isn't so much because of disagreement with these particular recommendations respecting the seabed, but because I don't believe the Marine Commission gave adequate attention to the other aspects of the public order of the oceans.

The concentration, to the apparent exclusion of almost everything else, on the regime of the seabed could be somewhat dangerous to the welfare of the United States.

It has been our experience in preparation for the conferences in 1958, and in other related conferences, that the international law of the sea constitutes such a complex, interrelated whole that you can't successfully deal with one aspect without getting involved to some extent with all the other aspects.

I am, therefore, concerned, because the present activity of the United States which seems to be leading toward the early convening of an international conference to consider the seabeds issue will almost certainly result in many other issues being brought before the conference.

I would like to refer to a statement made by Professor William Burke at a recent seminar at the University of Oregon. He has pointed out that it would be only prudent to inquire what other issues would come up at such a conference, how these might have to be adjusted in order to secure the kinds of agreements we might seek concerning the seabeds.

At this symposium he said, and I quote :

It certainly is not at all beyond anticipation that there will be a strong move by some states, perhaps a large number: (1) to secure agreement on a wide territorial sea; (2) to make it entirely clear (as it is not now) that warships do not enjoy a right of innocent passage through the territorial sea; (3) to assure exclusive fishing rights in a wide fishing zone as a possible alternative to a territorial sea of a particularly wide sort; (4) to establish new and more severe restrictions upon the conduct of scientific research; and (5) to place special restraints on military uses of the seabed, the water column and the surface.

As Professor Burke pointed out, in the proper exercise of prudence the United States, as well as other nations, needs to examine in some detail how its interests are affected by alternative dispositions of these several issues.

Unfortunately there is no evidence from the report of the Marine Commission, or of its panels, that these other aspects were considered, and that is why I am disturbed.

I would hope that these would be considered in some detail before we charge ahead too rapidly on the seabed issue.

Thank you, Mr. Chairman.

MR. DOWNING. Thank you very much, Dr. Schaefer. You have made an important contribution to these hearings. I will withhold my questions for the moment.

Mr. Mosher?

MR. MOSHER. Mr. Chairman, I submit that Dr. Schaefer's testimony this morning is exactly what we need as we begin specific consideration of the NOAA proposal.

I am referring, of course, particularly to the first third of your testimony. It is analytical and it is critical. It asks very significant questions and makes positive recommendations.

You necessarily skipped through your more complete prepared statement rather rapidly, and I think all of us are going to have to go back to your prepared statement and study it more carefully, but I for one am not quite sure what you mean at the point where you question certain couplings and recommend less coupling, if I understand correctly, in terms of organization between the activities of the oceans and the activities of the atmosphere.

As I understand it, you finally come down very, very definitely in support of an independent agency for ocean affairs, at least as a first step. If I understand correctly, that is the burden of your recommendation?

DR. SCHAEFER. Yes, sir. However, as to the independent agency, you see, the NOAA recommendation of the Commission is essentially to take ESSA, which within it contains the Weather Bureau, the Coast and Geodetic Survey, and the Bureau of Standards, and some other things which are involved in studies of the atmosphere and of the ocean, together with other agencies. It, however, leaves out certain agencies that are particularly concerned with ocean resources. For example, the Commission talks about a bunch of functions to be under-

taken, including surveys of the sea bottoms, but it completely leaves out such organizations as the marine section of the Geological Survey or the marine section of the Bureau of Mines, or the Maritime Administration or, most particularly, the Coastal Research Laboratories of the Army Engineers.

In other words, it includes an aspect of the ocean that is terribly important to a lot of people, that is its interaction with the atmosphere, and particularly the monitoring, surveying and forecasting aspect, but leaves out certain of the matters of the ocean environment and the ocean resources.

My personal opinion is that we might do better to have the various civilian concerns with the ocean all in one package, leaving the atmospheric things in a separate package, and rely on coordination of the two, rather than having them both partially in the same agency.

In other words, with respect to ESSA, then, one might go back to the way it was earlier. You would leave the Weather Bureau, and so on out of the ocean agency, the National Center for Atmospheric Research in NSF, or put it over in ESSA, but take the Coast and Geodetic Survey from ESSA and put it, together with NODC, Coast Guard and Maritime Administration together with the ocean responsibilities of Interior, in the new agency.

Mr. MOSHER. So as your first organizational step you would recognize the ocean activities.

Dr. SCHAEFER. Yes, I would put all of the civilian oceanic mission oriented activities in one package.

Mr. MOSHER. You would make the new organization in that respect, the ocean respect, more inclusive than the Commission recommended?

Dr. SCHAEFER. Yes, sir.

Mr. MOSHER. At the same time, though, I hope you are not denying in any way or deemphasizing in any way the fact as I understand it, and I am only a layman, that the oceans and the atmosphere have to be considered as part of a single system. That is, you can't work with the oceans without working with the atmosphere and vice versa, is that true?

Dr. SCHAEFER. Yes, sir; and I went into this in rather more detail in the paper I gave at Tom Clingan's seminar. As I pointed out there, taxonomy only exists in the minds of men. Actually the word is a continuum. All things are related to each other. But, unfortunately or fortunately, as one looks at it, you have to break it up into pieces to deal with it. The ocean is related to the atmosphere. It is also related to the seabeds.

Then you find that the atmosphere, of course, is very much controlled by the solar radiation, and so on. You also find the heat flow from the center of the earth, that affects the ocean, is related to problems of radioactivity in the earth's center.

So, if you put everything together, pretty soon you have such a large department that you have to break it up into bureaus within the department. All I am expressing is my own bias toward putting all the civilian aspects of the ocean and its uses and our mastery of it, and our handling of its environment, into one package, recognizing we have to work together with the atmospheric people, but leaving the coupling between atmosphere and ocean, organizationally, a little more loose, and having the coupling of all of the various civilian uses of the ocean a little closer.

Mr. MOSHER. Would you object to the inclusion within NOAA of ESSA and the atmospheric interests provided that first, in emphasis, there was given this more inclusive action, there was effected this more inclusive organization of the ocean activities?

Dr. SCHAEFER. Not at all, sir. However, you must think about what you get into organizationally if you do this, because if you put into your new organization the environmental modification and resources aspects of the ocean, then the question arises: Do you also want to put into the new organization those environmental modifications and intervention aspects of the atmosphere, of which there are two. One of them is the whole problem of air pollution, that presently is in HEW, and the other is weather modification that is now severally in three departments, ESSA, Interior, and Agriculture.

I would not object to it. I was merely pointing out some alternatives.

Mr. MOSHER. Then ultimately you raise the question of inclusion of NASA's activities in earth resources and solar radiation and all that sort of thing.

Mr. KARTH. Mr. Chairman.

Mr. DOWNING. Mr. Karth.

Mr. KARTH. Mr. Chairman, I was fascinated by the paper that Dr. Schaefer has given us. Pursuing just briefly what Mr. Mosher was pursuing with you, wouldn't it be possible, and probably more appropriate to put all of these functions that you mentioned, including atmospheric study, under one agency but breaking them down into different departments so that you could have a department for atmospheric study and control and you could have a department for oceanology and marine sciences and possibly even a third department? It seems to me that putting them under one agency and hopefully a new agency so that you don't have the built-in arguments that I think exist in well-established agencies such as you have, and inter-departmental squabbling and built-in bureaucracies and everything else, establish a brand-new agency and have these various departments within the agency all of which obviously could, under the right kind of administration, coordinate their activities and dovetail one's interest with the other as they must be coordinated to make up the total package?

Is this what you are thinking of, Doctor, really? Does that kind of approach make better sense to you than an NOAA approach as proposed or putting it, for example, in the Department of the Interior where you get the same age-old squabbles of bureaucracy?

Dr. SCHAEFER. For that reason, and some other organizational reasons, I presented the choice of putting it in Interior or putting it in a new agency. I personally would like to see a new agency for at least two reasons. One, because it would be able to focus on the oceans and, second, because it would be a clearcut break with current bureaucracy.

Of course, as I said, I would be in favor ideally of the sort of thing that John Calhoun recommended in his letter of 27 June to Chairman Lennon where he says:

I visualize a desirable ultimate federal organization as including a department of natural resources and environments which would bring into focus all federal policies and programs in these areas. Major elements of such a unified department would be sub departments of the ocean, of the atmosphere, and of other resource systems.

I think that would be lovely. The only thing is, having spent a little time around town here, I figure it would probably take so long to do it that it would mean that we don't really get on with the ocean job. I think our Nation really requires to get on with its ocean affairs, and we have been studying it and recommending it now for 12 years—as I said, I got into this with NASCO in 1957 and we are now in 1969.

It is generally recognized by everyone that we really need to focus on the mastery of, and the use of, the oceans for civilian purposes, for the welfare of mankind. So, the old quotation is that "The best is the enemy of the good." This would be the best. If you can accomplish it, fine. But I would hate to see us abandon the "good" of getting all us ocean people together, working on the problems of the ocean itself in effective fashion.

MR. KARTH. Yes, sir. I think from a practical standpoint, practicality occasionally must take precedence over what we might consider to be the very best possible organizational structure, I am inclined to agree with you that if you try to build the apparatus too large to begin with, you would probably end up with more than four legs and more than one head and possibly even several tails trying to wag both legs and head. As a result of that you are so busy trying to organizationally structure it to make it effective that many years would pass before you really got down to doing the things that the organization was originally intended to do or originally intended to have as its primary objective.

Thank you, Mr. Chairman.

MR. DOWNING. Mr. Pelly.

MR. PELLY. First, Dr. Schaefer, I wonder if you would satisfy my curiosity. You indicated dissent with the suggestion of the Commission as to an outer limit of sovereignty for the coastal states. What is your view as to the boundary?

DR. SCHAEFER. As I have pointed out in my full statement, I personally believe that the most appropriate boundary would be the outer edge of the continental terrace.

You see, you have the Continental Shelf and the continental slope, and these together constitute the continental terrace, that is where the continental land mass gives way to the deep sea floor. This is an appropriate geological division. There is the geology of the continental land mass, including the dryland, the shelf, and the slope; the whole continental block is of one kind of light rocks. The abyssal sea floor, composed of the basaltic, basic and ultrabasic rocks, is quite different. So this is a logical difference.

Secondly, the mineral resources of two kinds of rocks tend to be different.

Thirdly, there is a certain amount of argument going on to the effect that a good many of the nations, when they adopted the Convention on the Continental Shelf at Geneva, believed that the coastal nation's jurisdiction extended on down to at least the base of the continental terrace.

In fact you will note that Mr. Auerbach's panel recommended revising the convention to establish their recommended new boundary.

Another boundary at the approximate depth of the outer edge of the continental terrace has been also recommended, I believe, by

the American Section of the International Law Association. I believe also it has been approved by the International Law Section of the American Bar Association. Your Counsel can correct me if I am wrong.

I personally believe this would probably be the most appropriate boundary. It occurs at a depth of something like 2,000 or 2,500 meters. I think such a boundary would probably be a better way of separating the continental from the deep ocean mineral resources, and furthermore I think it might be a little easier to accomplish internationally than the Commission's recommendation.

MR. PELLY. Well, I am glad to have your view. We had a representative here the other day from the American Bar Association. I personally am fearful that in time we are going to abdicate some of the sovereignty that we have without our even knowing it, and I am hopeful that the House, as well as the Senate, might have some say if we are going to settle on any giveaway whether it be the United Nations or anybody else.

I was tremendously interested in your suggestions. Everybody says they don't want a wet NASA. I don't want to pass that over without indicating my own belief that NASA has worked out its difficulties and done a remarkable job and their jurisdictional problems with the military and others were very difficult to start out with, but they worked it out.

The problem arises here in putting all the marine interest under one agency. We have been struggling as a Congress for session after session with similar problems. For example there was a Presidential suggestion during the Johnson Administration that we combine all forms of transportation under a Department of Transportation and some of us thought that it would be better to have an independent Maritime Administration.

That issue has not been solved, and so when we start thinking of putting all the marine functions that you suggested, including the engineering functions of the Army Engineers into a new agency, I think we are going to have a problem from a political standpoint.

Obviously you have a tremendous knowledge of the structure of government. I was impressed, but I thought you rather easily passed over some of the difficulties. As you know, in the Pacific Northwest we have the Corps of Engineers recommending dams which would destroy resources such as the beds for spawning for the salmon, for wildlife, and their one function seems to be to keep themselves going with more important jobs. Some of us doubt at times the value of the projects the corps proposes. Then, to think of putting the corps in the same agency, did you think of their marine functions as including the function of building a dam?

DR. SCHAEFER. No. Perhaps, Congressman, I should clarify what I said. I apologize for having confused you in my testimony. I was advocating including only the so-called coastal engineering research laboratory of the Army Engineers. It used to be called the beach erosion board. That is the component of the Army Engineers that deals with studies of the movement of sand, and so on, and how you take care of it.

I was not advocating encompassing all of the aquatic activities of the Army Engineers, including their dam work. Nor was I even being

so bold as to include in the new agency their functions respecting permits for construction in navigable waters, although you might think about it. But the beach erosion board, or the coastal engineering research laboratory, is essentially a scientific, monitoring and engineering service having to do with the beaches.

One of the reasons, sir, why I believe one has to think seriously about combining all marine functions is because of the problem we have in our coastal zone, that is in the area from, say, one hundred yards, or a mile, back on the beach out about 20 or 30 miles offshore.

You have this problem in Puget Sound. You have it on your outer beaches, certainly near the mouth of the Columbia River, and we have it in California. Of course, off New York is a notable case. In the same piece of ocean we are catching fish commercially, and we are catching them recreationally. We have people running around with sailboats and water skis, and otherwise having fun. We are bringing ships in and out. We are making harbors. We are using the sea-water for cooling, for powerplants. We have the whole multiplicity of uses of the same piece of ocean, and I think, somehow, we simply have to start handling these things in a coordinated fashion.

This is one of the reasons, of course, why the Commission very wisely recommended the coastal zone authorities, to do exactly that. But if the coastal zone authority in a State is going to be effective, either the State or the Federal Government, or both, have to get on with doing the scientific research, and the monitoring, and the management that we need, and this includes the area beyond the State's jurisdiction, that is beyond 3 miles.

So I think the problem of the in-shore zone is one of the principal reasons for wanting to aggregate together as many of the marine functions as possible. I also believe, personally, that it is important to aggregate them so that we will be the leaders in the mastery of the resources of the more distant seas, but our most immediate problem is this in-shore coastal zone problem.

Mr. PELLY. One other thing that rather surprised me was your suggestion that the International Fisheries Commissions should be transferred from the State Department. You have some background in this having started out on the Halibut Commission. I have always thought that the coordination between the Bureau of Commercial Fisheries and the State Department was very good in that respect, and that actually it was such an international problem that it really had to be under our State Department.

Dr. SCHAEFER. Well, I can give you the reason for it. So as not to jeopardize the welfare of some of my colleagues who are still running international fisheries commissions, I would like this next remark to be off the record, if I may, sir.

Mr. DOWNING. It may be off the record.

(Discussion off the record.)

Mr. DOWNING. Back on the record.

Mr. PELLY. Doctor, I want to thank you for what I think is a very valuable contribution. We are going to be struggling with this problem and, as you know, it is not as simple to work out as it is to theorize when you are sitting in a witness chair considering the jurisdictions, the natural jealousies and so on which exist. I think if we did approach

it from the angle which you have suggested it might give us some fortification as far as a plan. If we just talked about marine functions then we are not necessarily robbing some other committee of some jurisdiction they have. We have had very difficult times in this Congress over that. We reported a bill here the other day to set up a Council of Environmental Quality, environmental advisers to the President, and immediately someone objected before the Rules Committee because it had to do with resources and their committee really had charge of resources in the land, and we never got our rule.

Here is one of the most important things that we could do for the country today in order to try to solve the problems of our environment but we ran into a jurisdictional question.

This is going to be a very helpful bit of testimony on the record, I think, and I am very appreciative of your appearance here today.

Mr. DOWNING. Mr. Feighan.

Mr. FEIGHAN. Dr. Schaefer, I have listened with interest to your presentation and also to your answers to the inquiries by my distinguished colleagues, Messrs. Mosher, Karth and Pelly. I just want to say that I believe that your contribution has been very significant. Thank you.

Dr. SCHAEFER. Thank you, sir.

Mr. DOWNING. Dr. Schaefer, you mentioned international relations in this field. Is that really at the present time a great problem with oceanographers and with research efforts?

Dr. SCHAEFER. Yes. In fact, it is becoming more and more exacerbated. The number of cases of refusal of permission has been going up at a doubling time, I would say, of about a year or 2 years.

Mr. DOWNING. You are free to roam the international waters.

Dr. SCHAEFER. Yes. The question is where international waters end, you see. There is the matter of freedom of scientific research on the seabed. Different countries have different ideas about how far out the national jurisdiction over the seabed goes. There is also the matter of contiguous fishing zones, and different countries have different ideas about that. So, although everyone recognizes that there is freedom of research on the high seas, these high seas are getting a little smaller all the time, also there are some kinds of research for which one has to go into the area that is clearly within the coastal States' jurisdiction. For one example, in relation to the Convention on the Continental Shelf, as I said before paragraph 1 of article 5 of the convention provides that there shall be no interference with fundamental oceanographic or other scientific investigations with the intention of open publication, but paragraph 8 of the same article provides that the consent of the coastal State shall be obtained with respect of any investigations concerning the Continental Shelf and undertaken there, although it goes on to say that permission should not normally be denied. But it often is. In order, say, for a geologist to make a comparative study of the geology of the continental shelves of the eastern and western Atlantic, he has to be able to go and take samples in both places.

We also run into the problem of what is meant by "undertaken there." Our Government has instructed the scientific community that as long as we are not taking any samples, as long as we are just using our echo sounder, or taking echo-soundings of the subbottom structures, this isn't "undertaken there." However, this is of not very much

utility if I am doing this and another sovereign says, "The way we call it, it is 'undertaken there', and you can't do it, or I will shove you in the calaboose." So it is becoming an increasingly difficult problem.

I have provided the committee with copies of a couple of fairly large studies on this topic, for your background information, that will give you rather complete details as to how this developed, and what the present situation is. But it is very serious.

Mr. DOWNING. Dr. Schaefer, on behalf of the committee, we appreciate your coming down here this morning, and you have given us a very valuable statement which will be read and studied and perhaps some of your judgments put into this.

Dr. SCHAEFER. I sincerely appreciate the opportunity, sir.

Mr. DOWNING. We will insert your biography in the record preceding your statement.

That will be all for this morning. Tomorrow we will have Mr. J. E. Flipse, president of Deepsea Ventures, Inc., Newport News, Va., and Dr. Douglas L. Brooks, president of the Travelers Research Center, Inc., Hartford, Conn.

Thank you very much. The committee will adjourn.

(Whereupon, at 11:35 a.m. the committee was recessed, to be reconvened at 10 a.m. Wednesday, August 13, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

WEDNESDAY, AUGUST 13, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:10 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The subcommittee will come to order.

I am going to request my distinguished friend from Virginia to present to the committee this morning his friend and distinguished constituent, the first witness, if he will, at this time.

Mr. DOWNING. Thank you, Mr. Chairman.

It is with particular pride that I welcome the witness this morning who has been a long time friend and really an expert in the field of oceanography but what I think is most significant, Mr. Chairman, is that this gentleman who heads Deepsea Ventures, Inc., is actively and presently in the field of oceanography. He knows what it is all about. He has been in the field at the beginning.

Deepsea Ventures, Inc., is a subsidiary of Tenneco, Inc., and this corporation has been funded without the idea of profit for the immediate future but hopefully will be profitable in the midseventies.

I am particularly proud of Mr. John E. Flipse, president of Deepsea Ventures here this morning.

Mr. LENNON. Thank you very much, Mr. Downing.

We would be delighted for you to come forward and I will ask unanimous consent that immediately preceding the statement to be made by the distinguished witness that there be printed in the record a biographical summary of our distinguished witness.

I realize, sir, that you do not have a prepared statement, called on as you were just a short time ago to participate in the hearings this morning. Will you just proceed and we are honored and delighted to have you, sir.

(The biographical summary follows:)

JOHN E. FLIPSE, PRESIDENT, DEESEA VENTURES, INC.

Mr. John E. Flipse, President, Deepsea Ventures, Inc., has had over 30 years experience in the marine industry. In addition to his at-sea experience, his extensive teaching and consulting experience, and his 13 years of industrial experience including 11 years service in management at the Newport News Shipbuilding and Dry Dock Company, Mr. Flipse was in charge of that company's oceanographic

program since its inception in 1962. In his capacity as manager of the Newport News effort, he has had the opportunity to work closely with all of the companies and oceanographic institutions involved.

Jack Flipse's prior position was Director of Research and Forward Planning of the Newport News Shipbuilding and Dry Dock Company. He joined that Company in 1957 as Research Engineer and Chairman of the Research Committee to formalize the corporate research program and develop long-range research goals. During his 10 years with that Company he served as Assistant to the President, Assistant to the Executive Vice President, Assistant to the Vice President and General Manager, Director of the F.D.L. ship project (until this project went "no-bid") and Head of the Systems Department. As Director of Research, he was responsible for direction of the Company's Hydraulic Laboratory and Model Basin, Materials Laboratory, Engineering Research Laboratory, Oceanographic Department, Systems Department, Technical Library and development of the Company Long-Range Plan.

Prior to joining Newport News Shipbuilding and Dry Dock Company, Mr. Flipse served for two years as Senior Engineer and Engineering Head of the Ship Stabilization Section of the Sperry Gyroscope Company. At Sperry he was responsible for the development, design, manufacture, installation and test of fin-type and gyroscopic ship stabilizers.

For the 10 years from 1945 to 1955 he was an instructor, Assistant Professor, Associate Professor and Assistant Head of the Engineering Department of the New York State Maritime College. Concurrent with teaching, Mr. Flipse served as a consultant in the fields of torsional vibration, Naval and commercial ship construction, Marine Insurance and Marine Surveying.

During World War II, Mr. Flipse served in licensed and unlicensed capacities in the U.S. Merchant Marine and at the U.S. Merchant Marine Academy at Kings Point, New York.

Mr. Flipse is a graduate of the Massachusetts Institute of Technology, Class of 1942, with the degree of Bachelor of Science in Naval Architecture and Marine Engineering. His graduate degree is Master of Mechanical Engineering from New York University. He completed, with distinction, the University of Virginia's course in Basic Advanced Management and has participated in special programs in Research Management, Corporate Long-Range Planning and Technology Auditing.

Mr. Flipse is active in professional societies and is currently a member of the Priority Committee of the Technical and Research Committee of the Society of Naval Architects and Marine Engineers. He is a member of the Marine Technology Society and serves on the Resources Subcommittee of that organization. He is also a member of the Transportation Panel of the National Academy of Sciences, The National Defense Transportation Association and the Propeller Club of the United States are other organizations in which he participates.

Mr. Flipse is the author of several papers, holder of several patents and is a licensed Professional Engineer in New York and Virginia.

STATEMENT OF JOHN E. FLIPSE, PRESIDENT, DEEPSEA VENTURES, INC., NEWPORT NEWS, VA.

Mr. FLIPSE. Mr. Chairman and members of the committee, my name is John E. Flipse and I am president of Deepsea Ventures, Inc., a subsidiary of Tehneco Inc.

In commenting on the Stratton report, it seems appropriate that I concentrate on what one corporation is doing in the deep ocean for its longrun economic gain.

I will describe our work in the ocean at depths of 3,000 feet and more where we are developing the technology to recover deep ocean manganese nodules containing economic quantities of nickel, copper, cobalt, and manganese.

We have distributed to you members of the committee a folder that contains photographs showing some of the slides that we will put on the screen shortly. It also presents to you a paper that describes in detail the technical approach to the ocean mining equipment.

The folder includes a capabilities brochure and some biographical data on the members of our Deepsea Ventures technical team.

Last January I had the opportunity to brief some of you on board our research vessel *Prospector* about the work that we had been doing under the auspices of the Newport News Shipbuilding & Dry Dock Co. since 1962, and to give you a brief outline of our plans.

When someone says that it takes a decade to accomplish a program such as ours, we agree as we have completed the 7th year of the program. The overall message I hope to bring to you is that in your deliberations of the Stratton committee's fine report important consideration should be given to the fact that there is at least one U.S. company out working in the ocean, locating mine sites, testing mining dredging equipment, and operating refining processes by which the ores recovered can be economically processed to metal values for competition in the world metal markets.

The most economically significant metals that we see coming from the deep ocean as a result of our program are nickel and copper. Both are in very short supply with increasing shortages forecast.

The cobalt that will be recovered from the nodules should contribute to world economic progress on the basis of the many potential uses of this metal should its supply increase significantly.

Economic manganese deposits do not exist in the United States but there are ample reserves of high quality in Africa, South America and Asia. Deepsea's deep ocean mining program cannot be justified on any single metal constituent. All metal products will have to take their chances in the world market.

I have with me a set of slides that describe this deep ocean mining technology program now in its eighth year. The slides indicate the following:

We are in the final stages of sorting out potential mine sites to determine the most economical location and deposit assay considering mining and processing technology.

Our final design, model testing, and land checkout of an operating ocean prototype equipment is on schedule and it will test our technology on the Blake Plateau off the coast of Georgia and Florida next summer.

The hydrometallurgical processes needed to recover the metals from the nodules is progressing so well that we are moving our team from the Tenneco Laboratories in Piscataway, N.J., to our Gloucester, Va., headquarters for our miniplant and pilot plant testing starting this fall.

The slides that follow should give you a picture of our progress. Could we please have the lights down?

[Slides were shown.]

Mr. FLIPSE. This, gentlemen, is a deposit of surficial manganese nodules on the deep ocean floor. The manganese nodules are accretions, or gatherings, of metal oxides from the materials that are actually in solution in the water.

They normally form about a nucleus such as a shark's tooth, a grain of sand or some other enduring material.

The nodules come together in onion-like layers and in this case you can see on the slide the white lines of calcium carbonate and silica.

The constituents, normally, of a nodule such as this could be

between 20 to 25 percent manganese oxide, about 1 percent nickel, a half a percent cobalt and from a half to 1½ percent copper.

There is also a significant quantity of iron in the miner but it is, as yet, uneconomic to recover and then detriol materials such as the calcium carbonate and silica.

The Newport News Shipyard, which is in Mr. Downing's district, has had long experience in developing hydraulic machinery and ships. It was the decision of the company to try and put these two capabilities together in a study to determine the economic feasibility of recovering these surficial deposits from the deep ocean floor.

The slide shows a hydraulic turbine runner. This type of hydraulic equipment in the 200,000 to 300,000 horsepower range is a standard product of that company, also a Tenneco subsidiary, and it was this understanding of hydraulic engineering that led us to our original investigations.

Our first effort was the chartering of a very common trawler and going out to the Blake Plateau area where we lowered dredges and recovered significant quantities of manganese nodules.

Our search then took us with chartered ships through the North Atlantic where the actual deposits were found to be relatively scarce and of relatively low quality.

We then proceeded, in the shipyard program, to search the topographic highs, those areas where the deep Pacific rises to a depth of less than 2 miles, where we searched for a period of 2 years finding many interesting deposits and enough complications to suggest that our efforts should be extended to greater depths.

A data bank was compiled through exchange of assays for samples and locations with outfits such as the London Museum, Scripps, Woods Hole, other oceanographic institutions, and the universities as well as the Government agencies that were involved in deep ocean sampling.

This data bank contains some 30,000 points and we use these to guide us in our present exploration activities.

The result of the Newport News program was the design of a mining system and application for a series of patents. It is described in the paper that is in your folder and essentially looks like this.

There would be a mining ship capable of handling the dredge system and pipeline that would actually recover the nodules from the sea floor and pump them to a transfer barge or ore carrier.

The recovery would be accomplished by the dragging across the ocean floor of a gathering head and then the pumping of the recovered material up the pipe and to the dredge ship.

The work that was done at the shipyard included extensive laboratory, engineering, design and computer studies. This is an example of the reconstructed ocean floor, the nodules distributed exactly as found in the deep ocean as recorded by photographs.

The gathering head is in the upper part of the picture and it is capable of going through this deposit rejecting the oversized nodules and collecting the nodules that could safely go up the pipe and through the pump.

Extensive experiments were done to determine the powers required and the amount of material that could be brought up a pipe. Here we see some modules moving through a 4-inch plastic pipe and we are delighted to report that the powers required are nominal, in the range

of 3,000 to 5,000 horsepower, and that the percentage of nodules that can be included in the stream of water and still effectively be pumped are significant.

When Tenneco acquired Newport News Shipbuilding and Dry Dock Company, it decided that the potential of the ocean mining program was adequate to form a separate corporation, to fund this corporation for at least 3 to 4 years, and to permit us then to concentrate on the development of the technology and the experimentation with at-sea equipment so that we could develop a mining and processing system to bring these metals from the sea floor to the marketplace.

This corporation was formed late in 1968.

We are currently located in Newport News, Va., in rented quarters and ground will be broken on our permanent office building in Gloucester County, Va., early this fall.

We are located adjacent to the Virginia Institute of Marine Science. I am fortunate to serve on the board of that organization and it is a fine small academic institution devoted to developing marine scientists and is an excellent complement to our technical staff.

The company, and I just show you this organization chart to make you aware, consists of people who gave up comfortable corporate positions in many of the country's outstanding industrial organizations to become part of the team because they are convinced that this is a technologically feasible program.

We are heavy in the scientific and technical area and we are very pleased with our people who are devoted and ambitious.

One of the important parts of our program is to find, on the deep ocean floor, a deposit of nodules that are high in metals, convenient to a processing base and in a favorable topographic situation; in other words, where the sea floor is flat enough and uniform enough to permit us to recover the nodules with the equipment that we are currently working with. This is the design of the gathering head and pumping system you saw a moment ago.

The *Prospector* is a converted cargo-passenger ship, 152 feet long, 32-foot beam and is air conditioned throughout. I would like to take you briefly through the ship and show you some of the equipment that permits us to study the sea floor.

The navigation is by the usual techniques or by the more modern technique such as radar loran and depth recorders. The ship is simple in its design and construction but it is extremely comfortable and well equipped.

It is currently working out of San Diego, Calif., and studying areas where we have information that indicates deposits of nodules on the sea floor.

The first exploration task is the preparation of a chart of the sea floor. Rather than navigate by the stars, we soon find ourselves oriented to the ocean bottom. We always construct a very careful chart using a precision depth recorder. This is done by sailing the ship on a grid and actually mapping the bottom of the ocean.

The next step is to inspect the sea floor and you see here the control center where the oceanographic equipment is operated.

A winch capable of recovering packages at 900 feet a minute and carrying over 22,000 feet of TV cable is in the hold of the ship.

This is the tripod which carries the TV camera system and permits

us to "fly" the camera, pull it at speeds of about 2 miles per hour over the ocean floor while we make continuous observations.

This is a picture of the gear as we were lowering it in the Atlantic on the Blake Plateau. It might interest you, gentlemen that the ship in the background is a Russian trawler mother ship which normally observes our activities.

Here is a slide showing the tripod going over the side.

Here is a photograph of the TV screen showing a sea floor deposit. When this occurs there is joy aboard the *Prospector*.

This gives you an idea of the clarity of the TV image in depths now of up to 18,000 feet. In order to preserve this information we make video tapes. On the Blake Plateau we have video taped a deposit in its entirety and after experimenting with our prototype recovery rig we expect to reexamine the area and determine the efficiency of recovery process.

We are also capable of making voice recordings on the video tape to give location and other data.

These are the Blake nodules in an area that we have designated as station 20 where we expect to operate the prototype rig next summer.

Every so often there must be some sadness and this is part of the sea floor which we do not expect to exploit. The reason for showing you this is that, in spite of some of the literature, the ocean floor is not uniformly paved with these deposits. They are in selected areas and, although there are huge areas, nodules are not everywhere.

This shows a dredge haul of the Blake Plateau nodules—this is rudimentary but effective testing equipment. This is the way we recover the nodules.

This again is a different type of dredge but it is a tool for recovering enough nodules to do the research necessary, in this case the processing research.

The nodules have a specific gravity of only about $2\frac{1}{2}$ and the quantity shown in the slide represents perhaps three-quarters of a ton of nodules.

Here is a closeup view of the nodules showing that they are frequently embedded in sandstone or silicates. We sometimes obtain sponges and other marine life in this exercise but the data that we have gathered suggests that we should be able to successfully separate, at the sea floor, the nodules from the other materials and to bring the nodules to the surface without damaging the ecology of the ocean.

In other areas the manganese oxides form as pavements and a great deal of publicity has been given to these. They are frequently of higher assay than the nodules but they present a much more difficult recovery problem and we are not, at this time, considering the mining techniques for their recovery.

This haul of nodules is the result of one trip. This tonnage has been moved to Gloucester, Va., for the processing plant experimentation.

The ship, of course, does a great deal of photography and is equipped with a photographic laboratory that can handle both still and movie films so that we can see what we have in the records before we leave the area.

This is the ship's electronics shop, since electronics and sea water normally mean trouble.

Here is the assay laboratory where we can do chemical assays as well as spectrometric assays to determine if the deposit is worth studying further.

And, of course, there is the map or chart-making room where the data is compiled into a trip report.

The ship is diesel propelled with the usual maintenance machine shops. An extra winch on the stern is used for sampling with that small chain bag dredge which shows at the extreme right lower edge of the picture.

Every so often we have trouble with the video system and so we retreat to conventional still photography. This is the camera rig, capable of taking pictures to any depth in the ocean.

Prospector is an important part of our program and will be working out of both San Diego and Honolulu for the next year. During that time we expect to be able to make the selection of a deposit of adequate assay, in a location that will permit the transport of the material to a shore processing base, so that we will then have the data necessary to make economic evaluations of the practicality of an ocean mining operation.

The nodules come together very slowly. The ones that you have seen are in the neighborhood of 30 to 40 million years old. Unfortunately, it is an extremely complex mineral and in order to process it we have gone to our Tenneco Chemical Co. Central Research Laboratory and have done a great deal of work to look at many different approaches to getting the metal values out of the nodules.

These are some members of our team in that laboratory. The fundamental approach appears that we must take the nodules back into solution in order to then separate the metals by ion exchange techniques. Most of the metals come out in the oxide form. They must then be processed to the usable metal forms.

Work is progressing on schedule, as I mentioned earlier, to develop a prototype of this rig. Up until now the computer, the laboratory and the design offices have been the areas for most of our effort. We are now extending the work from 100 feet, which is the laboratory model, to a 3,000-foot system.

This system is completely described in the paper that I gave you in the information folder. It will permit us to test at sea the dredge system, the handling equipment, and the separation equipment to determine the engineering data necessary to extend this recovery system to 15,000 to 18,000 feet which is where we expect the final mining to take place.

The experiment will be conducted on the Blake Plateau because it is convenient to our Virginia headquarters and the Newport News Shipyard which will be instrumental in putting this system together, and because it is, under the current definitions, part of the U.S. Continental Shelf.

The system itself includes the dredge head, a tress to permit some adjustments to depth, a pipeline, a pump, and the necessary ancillaries aboard the ship to supply power and to handle and separate the nodules.

This is a view, and I won't bore you with the details, of the collection head. Mr. Chairman, I would like you to understand that this

equipment has been engineered to the point where we believe it entirely practical to construct it and to operate it.

It is not Mickey Mouse or Buck Rogers hardware.

This photo shows an experiment, currently being performed, pumping in depths of 700 to 800 feet at a place called Galax, Va. This system uses air instead of a centrifugal pump to move the material. The airlift principle is where air is injected into the pipe and the expanding bubbles cause the column to move.

This experiment is progressing satisfactorily and we will soon be in a position to decide which of these techniques should be used for pumping the material.

It has been a pleasure to bring you this brief outline of our operation and I would be delighted to answer your questions if I am able.

Mr. LENNON. Thank you for a really fascinating projection of what we hope will be a potentially economic benefit in the field of ocean mining.

The gentleman from Pennsylvania, Mr. Goodling.

Mr. GOODLING. Thank you, Mr. Chairman.

I first of all apologize for not being too faithful in my attendance here. There doesn't seem to be enough days of the week anymore. I was wondering how this committee is associated with this work.

Mr. LENNON. It is associated with it to the degree that we are involved in the ocean science and engineering as well as in oceanology and oceanography.

As the gentleman will recall, having read I am sure the Stratton Commission's report, they go into the economic benefits that can be derived from the exploration and exploitation of the ocean resources, including mining of the ocean floor.

We are involved, hopefully we are, and we intend to be anyhow, I assure the gentleman.

Mr. GOODLING. That is all.

Mr. LENNON. Mr. Downing.

Mr. DOWNING. I would just like to re-echo my chairman's observation that this is fascinating to see an active operation in ocean mining and, my friend Mr. Goodling from Pennsylvania, this is the first presentation where we have seen something actually in being. These people are out there and dredging these manganese nodules. Incidentally, have you seen some of those nodules?

Mr. GOODLING. No; I haven't.

Mr. DOWNING. Take one back to the office.

I had certain questions which came to my mind during the presentation. Is there any reason for these metals being in specific areas? Are we able to understand why they are in certain areas and not in other areas?

Mr. FLIPSE. Yes; the environment needed for the formation is quite specific. It must be an oxidizing environment. There must be no sediments there. There must be water movement, at least some current movement, and so on; and so areas adjacent to the coasts of most of the nations are barren because of the sediment that come from the land.

There is, Mr. Downing, a large area of study involved here but the fundamentals of the environment and why they form are understood. Just how they form and so on is not understood. It is an area of continuing research.

Mr. DOWNING. Have you detected any gold in this operation?

Mr. FLIPSE. The gold appears in the nodules at about the same level as it does in a solution in the ocean which appears presently to be uneconomic to recover. It is a very, very small percentage.

Mr. DOWNING. There is probably no feasibility to obtaining gold.

Mr. FLIPSE. No. Although it appears that it might be feasible to recover the silver. It would not pay, at present, based on our determinations, to look for the gold.

Mr. DOWNING. Does Deepsea intend to go into the processing of these minerals?

Mr. FLIPSE. Deepsea is developing the technology for the processing. It is our business objective to develop this technology and make it available to our parent company and to others that would form a consortium to actually exploit it, but the answer to your question, sir, is yes, we are attempting to develop the processing technology.

Mr. DOWNING. Do you have any governmental aid?

Mr. FLIPSE. The only governmental aid, sir, is that we are currently a losing part of the Tenneco family and so whatever tax relief they get is the only form of aid.

Mr. DOWNING. Of course, you have Government cooperation?

Mr. FLIPSE. We have had excellent cooperation from the Office of Naval Research Group. We have done a good deal of work with the Bureau of Mines' team that is working in the same area and we hope we are keeping the State Department and the other interested governmental agencies informed so that there will be a full understanding of our program.

Mr. DOWNING. I want to thank you for a most interesting presentation.

Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Downing.

Mr. Pelly, you were not privileged to hear this fine statement and to view the scenes that we saw related to the statement.

Mr. PELLY. Mr. Chairman, I had to appear before the Tariff Commission at 10 o'clock this morning. I realized that we were going to be favored with a witness that I would have very much liked to have heard.

I want you to recognize that it was only because I couldn't make it that I didn't get here sooner to listen to you, Mr. Flipse. I had hoped that maybe you would have a prepared statement and I could catch up later.

Mr. FLIPSE. We will submit a prepared statement. I regret that we did not have enough notice to prepare this beforehand but we will submit one as soon as possible, sir.

(The statement follows:)

STATEMENT OF JOHN E. FLIPSE, PRESIDENT, DEEPSEA VENTURES, INC.

Mr. Chairman and members of the Committee, my name is John E. Flipse. I am president of Deepsea Ventures, Inc., a subsidiary of Tenneco Inc. In commenting on the Stratton Report, it seems appropriate that I concentrate on what one corporation is doing in the deep ocean for its long-run economic gain. I will describe our work in the ocean at depths of 1,000 meters and more where we are developing the technology to recover deep ocean manganese nodules containing economic quantities of nickel, copper, cobalt and manganese. I will also

state some of the pertinent implications of our long-range operations. Our program started in 1962 and we agree with many who say it takes about a decade to accomplish a program such as our deep ocean mining effort. We have completed the seventh year of that program.

Summary

The overall message I hope to bring to you is that, in your deliberations concerning the deep ocean portions of Dr. Stratton's and his Committee's fine report, important consideration should be given to the fact that there is at least one U.S. company out there: Locating mine sites; testing mining and dredging equipment; and operating refining processes by which the ores recovered can be economically processed to metal values for competition in the world metal markets.

The most economically significant metals we see coming from the deep ocean as a result of Deepsea's mining program are those scarce on world-wide basis such as nickel and copper. Both are in very short supply with increasing shortages forecasted. The cobalt recovered from the nodules will also contribute to the world economic progress, and therefore Deepsea's, on the basis of the many potential uses for this mineral should its supply increase significantly. Economic manganese deposits do not exist on the U.S. continent, but there are ample reserves of high quality in Africa, South America, and Asia. Deepsea's deep ocean mining program cannot be justified on any single metal constituent—all metal products will compete in the world market!

Mr. Chairman, I have with me a set of slides and a technical paper with illustrations that describe this deep ocean mining technology program now in its eighth year. These materials indicate the following:

We are in the final stages of sorting-out potential mine sites to determine the most economical location and deposit assay, considering the mining and processing technology.

Following up on our patented system, our final design, model testing, and land checkout of the ocean prototype is going according to schedule and it will test our technology on the Blake Plateau next summer.

The hydrometallurgical processes needed to recover the metals from these deep ocean ores are progressing so well that we are moving our team down from the Tenneco Laboratories at Piscataway, New Jersey, to our Gloucester, Virginia, headquarters for mini-plant and pilot plant testing to start this fall.

International and national actions taken now, relative to deep ocean activities, will affect a U.S. company attempting to develop the ocean's resources.

The background of the deep ocean program

Since the *Challenger* expeditions of the 1870's, man has known of the extensive deposits of minerals on the floors of the deep ocean. In the last several decades, the oceanographic community has explored these deposits and developed fragmentary information on the quantity and quality of many of the minerals. with considerable emphasis placed on manganese nodule deposits. Figure A* is a photograph we have taken of some manganese nodules, most of which lie on the surface of the deep ocean bottom, generally in waters in excess of several thousand feet. The most valuable of these deposits are known to lie in the deepest waters.

As support information, Mr. Chairman, may I point out that manganese nodules are an accretion of varying percentages of manganese, iron, nickel, cobalt, copper, carbonates, and silicates, and other materials. The nodules generally appear as shown in Figure B* which is a photo of a medium sized nodule. As you can see, they are generally potato-shaped lumps, black in color. On the right hand side of the illustration is a sectioned piece of nodule. Here, growth rings can be seen as the constituents come together in the deep ocean. The rings indicate period of growth based on conditions in the location where the nodule was formed. The core of the nodule is a hard long-lived ocean floor item such as a shark's tooth, whale's earbone, grain of sand, or small lump of fossil matter. Data and information concerning manganese accretions in nodule and in slab form has been collected by various groups, in a variety of ways, throughout the world for almost a century.

In 1962, the Newport News Shipbuilding and Dry Dock Company started exploration, research, and development in the areas of sampling, recovery, transfer,

*NOTE.—The photographs referred to were placed in the files of the subcommittee.

shipment and processing of the manganese nodules. This program was part of a series of diversification studies to apply the Company's industrial products and shipbuilding capabilities to new product lines. To initially evaluate the reports of the occurrence of manganese nodules, Newport News Shipbuilding and Dry Dock chartered a common scallop trawler (shown in Figure C*) and set sail for the Blake Plateau area. Here a variety of dredging and photography runs were made to ascertain the veracity of the reports. Significant quantities of manganese nodules were recovered during this period. They were subsequently used in the other research and development areas pertaining to a mining concept. Additional investment was made by Newport News in exploration work using other chartered vessels, as well as on their newly acquired and completely outfitted research vessel, *R/V Prospector*.

In parallel with the exploration work, Newport News undertook the design and development of a mining rig. Their analyses, designs, and tests produced the patented details of the generalized concept shown on Figures D* and E*. In Figure D, the two surface vessels are shown which perform the mining and transportation functions. To the right is the actual mining ship showing the deck gear and other handling and storage equipment needed for lowering and retrieving a mining rig to the deep ocean floor. Trailing behind the mining ship is an ore carrier, or ore barge, for storage and transfer of the nodules to the shore located refining plant. The selection of the type of ore carrying vessel would be based on the proximity of the particular mine and its processing plants.

The considerable investment in the test and development phase of these concepts led to a series of patents and a fully engineered preliminary design of the system. In addition, the cost of the proposed mining equipment designs were estimated to permit detailed economic studies demonstrating the potential of such a venture. The Newport News Shipbuilding and Dry Dock Company's main interest in this area was in providing the equipment to enable mining companies to recover the manganese nodules. Newport News also worked with a number of other major U. S. companies in furthering the processing research to obtain marketable metal values from these somewhat unique and complicated ores.

Mr. Chairman, I submit to you a complete description of this initial mining system which was provided in the recent Offshore Technology Conference Paper 1035, which I authored and is appended to this statement. This paper describes the mining system in detail; the method of mapping and locating deposits on the sea floor; the concentration, screening and gathering of nodules on the ocean floor; the dredge and cargo handling equipment; the mining ship operation and briefly discusses the processing considerations. Also provided is a list of the patents which were awarded covering this system, a description of the Research Vessel *Prospector*, and several drawings of the key elements of the deep ocean mining system. Much of the work described in this paper predated the organization of Deepsea Ventures, Inc. Also predating the organization of Deepsea Ventures was the development of an extensive data bank including about 30,000 data points describing nodule occurrences throughout the world.

The foregoing "oceanographic package" including engineering designs, economic studies, data bank, patents, and the fully operational, sophisticated Research Vessel *Prospector* became the nucleus of Deepsea Ventures, Inc., a subsidiary formed by Tenneco Inc. in late 1968. An organization chart of Deepsea Ventures, showing its key personnel, is shown in Figure F*. Our Company, now numbering over 20 key technical people and 40 in total, was organized to create the technology needed to develop the oceans wealth.

The purpose of showing you the organization chart and describing our staff is only to indicate the kind of a team we believe necessary to carry out such a project. Our staff will grow to about 60 in the next few years and we utilize several times that number through subcontracts. Mr. Chairman, it is also important to emphasize that we exist only through the awareness and faith of these key people who gave up comfortable corporate positions in many of the country's outstanding industrial organizations to become part of the team. They, and our parent company, Tenneco, are obviously convinced of the technological and economic feasibility of the program.

The Deepsea Ventures, Inc. Ocean Mining Program

Figure G* is a photograph of *Prospector*. It is with *Prospector* that we locate, identify and determine the mineability of a nodule deposit. Our objective is to convert our limited knowledge of these occurrences into an economic recoverable marine resource. Basically, exploration is a three-facet undertaking.

*NOTE.—The photographs referred to were placed in the files of the subcommittee.

Under the guidance of our Chief Scientist, we first evaluate several possible locations in the general areas of operation available in our data bank. Upon *Prospector's* arrival, the first key piece of equipment used is the precision depth recorder such as the one shown in Figure H*. Through the precision depth recorder the scientists can ascertain the suitability of the bottom for ocean mining. We are interested to determine if there is sufficient area, of relatively flat bottom, to constitute an economic mine.

When we are on a location which meets these topographical requirements, we next assure ourselves that it is indeed a nodule deposit, as not all of the occurrence locations have sufficient nodules to be mineable.

In order to ascertain the presence of nodules and their density on the bottom, we use our unique 20,000-foot real-time TV. Figure J* shows the exploration scientist viewing the ocean bottom from *Prospector's* Operations Center through the TV screen. The particular picture you are seeing is transmitted through 20,000 feet of cable and is of the Atlantic Ocean floor in only 3,000 feet of water. Of course, as the water depth increases, we pay out additional cable giving the system a depth capability of 18,000 feet or slightly over 3 miles. As you can see on the screen, there is considerable nodule density in this location, about 2½ to 3½ lbs. per square foot.

Figure K* is a view of the TV equipment mounted on its tripod before it is put over the side. The cylinders suspended in this tubular structure are the camera, the sonic pinger, TV electronic components and a special light source. Once over the side, we are able to "fly" the TV camera over the bottom at about 2 knots. The TV picture is also recorded on tape for later evaluation.

When the TV equipment verifies the quantity and extent of the deposit, we must then assure ourselves that the nodules indeed have sufficient metal values to be of economic interest. Figure L* shows the recovery of the nodule samples and nodules being poured onto the deck of *Prospector*. The samples shown were not only assayed for metal content, but were shipped to our Gloucester, Virginia, laboratories for processing research to assure that the metal values can be recovered. We use many tons of nodules for this work. Figure M* shows about 40 tons of nodules in the hold of *Prospector* from one trip to the Blake Plateau.

Since the formation of Deepsea Ventures in late 1968, Mr. Chairman, most of the preliminary screening research for processes to recover the metal values was done by a Deepsea Ventures team under the direction of Dr. Paul Cardwell at the Tenneco Chemicals Company's Central Research Laboratory in Piscataway, New Jersey. Dr. Cardwell's team, utilizing these facilities and other support personnel, evaluated various known processes, as well as new processes, in the hydrometallurgical area. Figure N* shows some of the work done in putting the complicated nodule ores back into solution and then separating the metal oxides by ion exchange techniques thereby capturing the metals in a very pure form. As of September 1st of this year, this work, and subsequent mini-plant and pilot plant experiments, will be done at our Virginia facility.

The third phase of our program, the mining equipment development, will provide a full scale test of the system on the Blake Plateau, off the southeast coast of the United States, about a year from now. The test site is at approximately the point of the star shown on Figure P*. This project will convert the designs into a prototype test system that will be tested at sea. Important parts of this work are now being done in the laboratory and in test setups ashore. Some of the land-based tests are shown on Figures Q and R. Figure Q* is a pumping system test using a mine shaft about 800 feet deep in the western part of our state. Figure R* is a laboratory test pumping actual nodules in a plastic pipe to ascertain data on flow rates, pipe clogging, etc.

Impact and Implications of National Action on This Program

Mr. Chairman, our work in the ocean is not, in general, unique in terms of equipment or basic techniques employed. Our commitment is what makes Deepsea unique. The program, the team of people, the dedicated management and the funding and support of the Tenneco Corporation and stockholders makes our program capable of significant accomplishment. It was undertaken in anticipation of a similar commitment to the oceans on the part of the United States Government. Mr. Chairman, you and your legislative colleagues will be responsible for the environment in which our program must live. Whether or not we will convert deep ocean minerals to a national resource will depend on the

*NOTE.—The photographs referred to were placed in the files of the subcommittee.

results of your deliberations and subsequent actions. If the environment is constructive, we will move ahead. If the environment is restrictive or poorly defined, it will constitute a significant risk in the evaluation of the feasibility of deep ocean mining.

Let me illustrate this point by a brief example. An important component in our exploration is the deep ocean television system. Much work in the development of the TV camera had been done to meet a Navy requirement; the special 20,000-foot cable had been developed for oil well inspection; PROSPECTOR was available through the foresight of Newport News Shipbuilding and Dry Dock Company, a major defense contractor; a special winch existed, developed for that company's oceanographic research program; and the monitoring and tape recording equipment was available from a variety of commercial sources. Putting these elements together in a viable TV system was our contribution. No single company could afford the high cost of developing these several elements. A majority of the elements were developed as components in important government programs. Our government's long-term, consistent and dependable funding of a basic oceanographic program will create and maintain the progressive oceanographic industry upon whom Deepsea Ventures and similar technology-based companies can call for essential help in their problem solving.

Mr. Chairman, let it be clearly understood that I am not referring to government funding of our Deepsea Ventures' ocean mining program. We do not now have government contracts, nor will seek government support for this particular program, as the resultant technology will be our stock-in-trade. The 1966 Marine Resources and Engineering Development Act with the subsequent formation of the Commission on Marine Science, Engineering and Resources indicated our government's enthusiasm and sincerity in going ahead in the oceans. If this promise is kept, our environment will be favorable. Failure to carry out a majority of the recommendations of the Commission Report, "Our Nation and the Sea," or excessive delay in undertaking enough projects to create a "critical mass" of technology and scientific personnel could be expensive, and perhaps critical, to our undertaking and similar undertakings by other units of American industry.

"Our Nation and the Sea" has been well received, in the large, by the oceanographic, marine engineering and natural resource industries. Certain segments of the report are more meaningful to specific organizations of our marine community. I am not personally qualified to recommend or comment on the organizational or legal aspects recommended by Dr. Stratton and his group. The group was composed of people with this expertise who felt, as I do, that enough resources must be marshalled under central direction to assure proper funding and continuity. Whether this is achieved through the National Oceanic and Atmospheric Agency or through strengthening some existing agency is unimportant to me as long as your commitment is clear, the environment is positive and the entire marine community is "turned on."

A further area of importance to use, and the nation, is the need for a clearly defined international legal regime for the deep ocean floor. We are currently cooperating with our State Department and Interior Department in every respect to make the legal regime a calculable parameter rather than another area of uncertainty. Again, Deepsea hesitates to prescribe government jurisdictional, organization or treaty verbiage, but is anxious to delineate the requirements of a legal regime which will create an environment favorable to the development of marine resources.

Conclusion

Mr. Chairman, in conclusion I would like to state that we believe a program such as ours clearly demonstrates the need for the early implementation of many of the Stratton Report recommendations. If NOAA is critical to the carrying forward of these recommendations, let there be NOAA. In any event, your Committee's current and future actions are vital to the creation of a "real world" for the development of ocean resources. I very much appreciate this opportunity to describe to you how one company operates in the deep ocean and how our problems, progress and success relate to your demanding legislative duties. Thank you very much.

*NOTE.—The photographs referred to were placed in the files of the subcommittee.

Mr. PELLY. You indicated as I walked in, in one of your comments that we couldn't hope to recover gold in paying quantities. Does that apply to any particular area or in general?

Mr. FLIPSE. In general, I think that is a correct statement and this, of course, is not gold from the sea floor but rather gold from the surficial deposits, the manganese nodules, because the gold appears to be in there at very low levels in any of the some 30,000 specimens that we have examined.

Mr. PELLY. Of course, there are areas where there is considerable gold. I am thinking particularly of Gold Beach, Oreg., where during periods of the depression in the nineties I understand that they were able to pan that beach sand and make about a dollar a day which was rather satisfactory for those days considering the value of the dollar and the shortage of money.

Mr. FLIPSE. Yes, sir.

I was trying to distinguish this type of deposit from the modules. Those are the placer deposits and they are being explored. There is considerable interest in the placer deposits but they should be distinguished from these deep ocean floor surficial deposits to which we are addressing our current effort.

Mr. PELLY. I think the placer deposits offer real possibilities. I talked to a man once who had gone out in the early days looking for gold and had encountered a certain storm situation which apparently took the sand away and left a beach that looked like sheer gold.

I thought it was probably fool's gold or something because he didn't believe that it could be that way and then after the change of tide and the change in the storm conditions it disappeared.

There is an awful lot of gold there if you have the right kind of dredge to get it, I am sure.

Mr. FLIPSE. This effort is under way by other companies and whether it will be economically feasible is yet to be seen.

Mr. PELLY. I imagine off Nome the conditions are that way, too, and there will be possibilities of getting gold where originally they had, of course, the tremendous gold discoveries and recoveries. I guess that is where the ton of gold first came from in Alaska that caused such a gold rush and really developed the entire Northwest.

Mr. FLIPSE. That is the area where they are concentrating, sir.

Mr. PELLY. Thank you very much.

Again, I want to say I am sorry that I didn't get here in time to hear you and I will look forward to your prepared statement at a later date.

Mr. LENNON. Thank you, sir.

Mr. DOWNING. May I ask a question?

Mr. LENNON. Mr. Downing.

Mr. DOWNING. Mr. Flipse, do you have any idea of what the extent of the mineral deposit is on Blake Plateau?

Mr. FLIPSE. We have an idea which is probably somewhat inaccurate. We have looked at a small area and studied it in depth where there is approximately 600,000 tons of this material readily available, in an excellent topographic area, in depths of just under 3,000 feet, and this is the area where we expect to conduct our prototype test.

If you include the pavements and so on there are probably in the

hundreds of millions of tons of manganese oxides in the pavement and nodule form.

However, the assay of this material is quite low. Manganese would be say 20 percent while its nickel would be a fraction of 1 percent which suggests that it would not be economic to recover.

Mr. DOWNING. Thank you.

Mr. LENNON. Thank you, Mr. Downing.

Mr. Flipse, the paper that is included in the package that was furnished to each member of the committee entitled "An Engineering Approach to Ocean Mining," was presented in Houston, Tex., in May of this year, May 18 through 21, to the First Annual Offshore Technology Conference. I assume that at that conference which was participated in by the various societies and organizations that you mentioned in the first part of this statement the discussion was in depth even to a greater extent than was done here this morning.

I can see how it was a great challenge. In hurriedly scanning this paper that was presented at that offshore technology conference, I see that your sister company, the Newport News Shipbuilding and Dry Dock Co., which is now Tenneco, I believe, have been involved in this program since approximately 1962.

What you have shown here by pictures this morning and what you have referred to represents a sustained effort, and obviously represents a substantial effort over a period of almost 7 years, doesn't it?

Mr. FLIPSE. Yes, sir.

Mr. LENNON. I think you say in the paper that you reach the conclusion on the basis of the presentation at that conference in May that the time for ocean floor deposit exploitation is now and that the tools that you demonstrated here this morning by your pictures and your statement are at hand.

In point of time, when do you think that you will process these nodules to the extent that you can determine the economic exploitability and feasibility of such a program of ocean bottom surfacial mining?

Mr. FLIPSE. Mr. Chairman, we expect that our exploration work, our prototype test and our processing-pilot-plant work should be completed by the end of 1970. We are using as a target the end of next summer but, with the necessary evaluation and so on, we hope to have the technology available to a consortium so that the program can get under way in the full scale business of building the dredging ships, putting up the processing plant and so forth in the early 1970's, 1971 on.

We would expect then that the system could be in full production by the mid-1970's, say 1974 or 1975.

Mr. LENNON. But I assume with obviously the great amount of funds that have been expended in the last 7 years to bring you to the point where you are today that your company, your engineers and your scientists have confidence that this is going to be in time a profitable enterprise.

Hopefully that is so. What do you say?

Mr. FLIPSE. We certainly share your hopes, sir, and we have made our professional commitments in the belief that this can be done. Tenneco is not a benevolent organization and they have been con-

vinced that this technology can be developed and there is, I feel, a very reasonable chance.

There are always technological obstacles, but we believe that we have the team and that enough work has been done, many millions of dollars spent over the last 7 years, so that it is technologically feasible and we will be able to recover these materials from the sea floor and get the metals out.

The economic feasibility will depend upon a great many factors, including the metal market, primarily, but also such things as tax structure, such things as the international regime which was faced and discussed in depth in the Stratton report, and fundamentally, sir, my purpose in bringing you this progress report was to make you aware that the deliberations of your committee relative to the Stratton report are essential to our environment, the business environment in which we will be operating in the seventies.

Your decisions regarding the Stratton report will be very important in determining this environment for us.

Mr. LENNON. Now, sir, being as familiar as you are with the Stratton Commission Report, are you in a position that you can comment on any of their specific recommendations especially related to their recommendation of the Government structure and a national advisory commission?

Could you give us your views with respect to the private enterprise industry thinking as to those two recommendations made by the Stratton Commission Report?

Mr. FLIPSE. I think that I certainly can speak for Deepsea Ventures and I hope that it will represent a cross-section of industries' opinion. The Commission's suggestion that there be an advisory committee is uniformly well received.

We believe this is a very important step.

Mr. LENNON. You mean the National Advisory Committee?

Mr. FLIPSE. Yes, sir, the National Advisory Committee. Certainly I do not consider myself expert on the organization of the Government offices but I do feel that it is important that the oceanographic program in the Government be given central direction, that there be a consistency in the program not the on and off that frequently characterizes the budget scramble when the direction is divided in many different departments.

I feel that if the oceanographic effort in the U.S. Government is consistent, it is projected, well grounded and the expectations are realized year by year, that this will create instrument companies, it will create service organizations and so on which will be very important to our success.

We should be able to turn to electronic companies with oceanographic capability so that we can get the necessary components to put our equipment together, and they can exist best in an environment where the future is at least indicated and where Government programs are conducted consistently and without the danger of losing their funding from year to year.

Mr. LENNON. Are there any other corporate enterprises comparable to the one that you speak for here today similarly engaged in the program that you have related or discussed here today?

Mr. FLIPSE. There are none that are quite the same. Most of them are past the funded organizational stage that we are now in. There are several that are older than we are and considerably more experienced and they sell their services to other industry groups to develop, for instance, the placer mining that was discussed earlier.

They are also searching for phosphates. There is a great deal of service work that these companies perform for the petroleum industry. But a funded program to develop the technology for deep ocean mining is unique in Deepsea Ventures.

Mr. LENNON. We note that in the private sector of the economy relating to the marine sciences and marine engineering that there is a consensus with respect to the Commission's report relating to the National Advisory Committee. There is a reluctance on the part of the private sector to commit itself to the specific recommendations of the Commission pertaining to a Government structure as such and we appreciate that because you folks have to work with the Federal agencies that would ultimately be involved in such a Government structure if such legislation was ever enacted into law.

We can understand that. But if you create the National Advisory Committee and then you don't create a Government structure, what will then be the functions of the National Committee? How will it be justified?

Mr. FLIPSE. Sir, the dilemma is well described.

Mr. LENNON. That is the reason I asked the question.

Mr. FLIPSE. I would hesitate to be prescriptive, and I feel that this is industry's problem as you recognize, however we can live with the agencies whether they are combined or whether they retain their separate identities.

I think that a great deal of constructive work was done for instance by the Interagency Committee on Oceanography. This is where Dr. Wenk got his feet wet in Government oceanography and it permitted him to function so well as the Commission's executive leader.

However, the NACA, if you will, the old National Advisory Committee on Aeronautics, was structured carefully with people of enough capability and recognition, Government, academic, and industry, so that their deliberations were very effective and, if they could not relate with just one agency, they still were able to provide information, to have a funded operation where they could coordinate and gather together enough of the technology so that there was a central thrust to this development of aeronautical techniques and technology.

Mr. LENNON. Let us go back and talk about the ad hoc committee, the so-called Inter-Agency Committee on Oceanography.

The gentlemen of this committee after working very closely over the years with the so-called Inter-Agency Committee on Oceanography found that it did not have sufficient statutory stature to make a definitive national policy related to all the fields of oceanology and that is the reason why the committee made the decision to create the National Council on Marine Resources and Engineering Development.

Wouldn't you agree that the National Council on Marine Resources and Engineering Development created by an act of Congress to reach the high level of policymaking and also at the advisory level because

of the fact that it was, No. 1, chaired by the Vice President, mandated by statute that he should Chair it, mandated by the statute that you would have I believe five Cabinet-level officials on that Council and two others, one representing the nuclear science part of our Government and one other, won't you agree that that level was more effective than the Inter-Agency Committee on Oceanography?

Mr. FLIPSE. I certainly agree.

Mr. LENNON. It was our experience with the Inter-Agency Committee on Oceanography in having them appear before this committee from time to time that we would find out that certain departments and agencies and bureaus which had a statutory responsibility in the field of oceanography were not even represented on that Inter-Agency Committee on Oceanography and we asked why.

They would say, "Well, we just haven't thought to invite them to participate" and within a matter of 24 to 36 hours there would be someone designated as a member of this Inter-Agency Committee on Oceanography from one of those departments or bureaus.

This was one of the reasons that we believed it was necessary to establish the National Council. I wonder if you establish this National Advisory Committee as recommended by the Stratton report, who would it advise? Who would it counsel?

Of course, it would be helpful but unless you establish some sort of a Government structure to have the statutory responsibility of carrying out the will of the Congress, I don't believe we will have accomplished much.

How about two other recommendations of the Stratton report relating to the coastal zone authorities and the zone laboratories? What is your feeling about that?

Mr. FLIPSE. I do not feel that Deepsea is currently engaged in areas where the coastal zone laboratories would be of particular interest to our program. As an engineer and scientist in this area, I feel that they would be extremely constructive in the long range and certainly as our objectives broaden in our company we would find them extremely useful centers for coming with our problems and also for coming to support the activities and the works of these centers.

We feel they would be good customers for us in the future, as well as an excellent source of data and information. The specific recommendations in the Commission report I feel are to the point. They are, in general, recommendations with which I can agree and the nature of the coastal zone and the laboratory efforts I feel are useful certainly in the time frame in which the Government should be concentrating their interest.

For instance, I believe that our program illustrates that industry is prepared to go ahead with the development of deep ocean minerals. Certainly the oil industry has been willing to go ahead with the off-shore oil program and these are areas where direct Government participations probably is not indicated.

However, in the coastal zone area, because of the myriad of complex problems, I feel that the Stratton Commission recommendations are to the point here and should be carried through.

Mr. LENNON. Are there any other questions, gentlemen?

Counsel, do you have any questions?

Mr. CLINGAN. I have one or two.

Mr. Flipse, to go back to your discussion with Mr. Lennon with regard to the Stratton Commission's proposals for Government organization, I can understand how you are in a position where you would not like to comment on the structure.

May I ask what functions and services that Government could provide would be of value to a company such as yours if they were brought into a centralized agency?

Mr. FLIPSE. One of the most valuable areas that we have found in the Government is its expertise in the hydrographic area. ESSA has contributed appreciably to the charting effort and the Navy has done a great deal of work here and, except for the need-to-know requirement, we have been able to get support from the Navy Oceanographic Data Center so that we are not surprised by the topography of the sea floor.

A very mountainous or rough area we feel would be a poor selection for an initial mining effort because it just adds one more hazard to the process.

To get that data from the Navy is quite possible. It is a little more difficult than, certainly, if there was a centralized function where this was essentially a civilian agency and, as the Stratton Commission proposed, this data center would be a part of it and I suspect the data would be more readily available and this would be a very real service to ourselves or anyone else that goes into exploitation of the deep ocean.

This is a specific. I feel there are many others. The coordination of the Bureau of Mines program with the work that is being done by the Geological Survey would be valuable, I think, to both organizations and again this is consistent with the Stratton Commission proposal.

May I suggest my reluctance in commenting on the organizational mechanism is not what you could call corporate cowardice nor is it a lack of person conviction on this matter but I feel, as a witness, I do not possess the necessary expertise to state a corporate position.

Mr. CLINGAN. I can understand that but, to just explore your position on this, I gather what you are saying is that you are saying that these services, such as aids to navigation and mapping, and the provision of fundamental scientific and technological data for industry would be desirable in a centralized national organization, if there should be such an organization.

Mr. FLIPSE. Highly desirable, Mr. Clingan.

Mr. CLINGAN. Thank you.

Mr. LENNON. Do you agree that the Commission report has stimulated private enterprise to move, well we won't say take a giant leap forward but to take a little forward step in the field related to what you are doing as well as the other private sector of our economy interested in exploiting the ocean floor and the Continental Shelf?

Mr. FLIPSE. Well, Mr. Chairman, it has been a very important publicity to the oceanographic effort. I think that the results of that Commission report, however, as exemplified by the action of your committee in considering a bill to form NOAA and so forth, that the funding that the Government actually provides as recommended by the Commission report, even if it is fragmented funding not through a central agency, and the Government's sincerity as exhibited by your

actions, will be much more important in stimulating the ocean development by industry than the report itself.

Mr. LENNON. Well, I am sure you haven't overlooked the fact, when you say that the Commission report stimulated this committee to move forward with hearings to consider the implementation of the recommendations of this report. I don't want anyone to overlook the fact that this committee had quite a problem in bringing that law into being which created or authorized the President or mandated the President to appoint the Commission.

We had a problem with the executive branch of the Government when we moved in the direction of creating by statute the National Council on Marine Resources and Engineering Development. That was resisted by the administration on the philosophy that it would be repetitious of the Interagency Committee on Oceanography, but they hadn't been in being more than 6 months before they recognized that the Congress had the right view and they did not have the right view.

Of course, we recognize as we move in this consideration of the Commission report that we are going to have many problems. I think some of the heads of the various departments at Cabinet level have spoken out too quickly before they made their appearance before this committee with respect to their views.

We hoped that the Government agencies would be ready to appear before this committee long before now, but they asked for time. We have given them time, but we are not giving them more time after the middle of September to make their appearance before this committee and give us their views.

We appreciate your appearance this morning and what you have related to us and shown in the film is stimulating, because I think that most people recognize that the economy of our country is going to be helped in the field of the marine sciences related primarily to the private sector of our economy and that the Government should not exploit the ocean but should let the private sector do it but we should be in the position to advise and counsel with them.

That is our position.

Thank you very much for your appearance here. I understand that counsel has another question.

Mr. CLINGAN. Just to fill out the record, what minerals or metals in the manganese nodules do you think will become economical for exploitation?

Mr. FLIPSE. Well, the constituents that we feel will get to the marketplace will be nickel, copper, cobalt and manganese and probably in that order of ease of entry into the market just because of the supply and demand situation, as we see it now, for the next 10 years.

Mr. CLINGAN. Do you think that the introduction of these metals from the sea will have any considerable economic impact on the land producers of these metals?

Mr. FLIPSE. I feel that, in the case of nickel and copper, supplying these metals from the sea probably will tend to keep the prices of these metals from advancing more rapidly than they are advancing now.

On cobalt the availability of large quantities from the sea, which is a byproduct, should lower the price of cobalt and permit cobalt then

to become a more available material and certainly uses will develop when the price is reasonable.

In manganese, it will be a difficult market for the manganese to compete in. However, the marine manganese product is fortunate in that it will be a high purity product since it will be obtained by a chemical process and, therefore, it is very well suited to the basic oxygen furnace method of producing steel which requires high purity manganese, and this is the growing steel-making facility.

So that the supply of high purity manganese should match the increased need for this in the steel industry. But it will be a very competitive situation in manganese.

Mr. CLINGAN. Thank you.

Mr. LENNON. Thank you.

I mentioned earlier the Commission report and you agreed with me about it having stimulated the private sector of our economy. I think you shouldn't overlook the fact that it has certainly probed and punched and jabbed a little bit and stimulated some of our Government agencies with respect to moving in this field.

I know several agencies that have shown quite a bit of interest, renewed interest or I would say it was a complete new interest in this field and have tried to move into it as a result of the Commission report. It is strange to me that they never were stimulated before.

I don't say that they got into it in anticipation that something might happen in the fragmentation of their agency into a new Government structure but something happened and that is very fine.

Thank you very much.

Mr. FLIPSE. Thank you.

Mr. LENNON. Our next witness is Mr. Douglas L. Brooks, president of the Travelers Research Center, Inc., Hartford, Conn.

Do you have a prepared statement?

STATEMENT OF DOUGLAS L. BROOKS, PRESIDENT, THE TRAVELERS RESEARCH CENTER, INC., HARTFORD, CONN.

Mr. BROOKS. Mr. Chairman, I do have a statement. Unfortunately vacation schedules in Hartford, mainly my own, prevented me from bringing copies to the committee.

I will proceed to read the statement and make copies of it available.

Mr. LENNON. Do we have your biography or résumé summary?

Mr. BROOKS. No, Mr. Chairman.

That is also in the package that I will supply you subsequently.

Mr. LENNON. Without objection, it will be inserted in the record immediately following your statement.

Mr. BROOKS. Yes.

My name is Douglas Brooks. I am president of the Travelers Research Corp. in Hartford, Conn. The Travelers Research Corp. is a self-supporting organization of about 200 people.

We are engaged in contract research and consultation for Government and industry on problems that relate to the use or the misuse of the environment, not only the marine environment.

Mr. LENNON. Let me interrupt you now.

The gentleman who has just testified is with a company that I assume is a wholly owned subsidiary of Tenneco. By any chance are you the wholly owned subsidiary of the Travelers Insurance Co.?

Mr. Brooks. We are a wholly owned subsidiary of the Travelers Corp., of Hartford, Conn., and it is not by chance.

Mr. LENNON. I wondered about that. Go ahead, sir.

Mr. Brooks. I am particularly pleased to be here at your request to comment on the Stratton commission report.

Let me say at the outset that in my opinion it is an extraordinary report in both its quality and its importance and I welcome this opportunity to underscore those portions of it that I feel most strongly about.

I might also say it is a formidable report and I do not claim to be equally informed on all portions of it.

In speaking about the report, let me say first that my point of view might be described as that of an outsider or to use a less modest term a generalist. The point is that I do not identify myself nor the Travelers Research Corp. with any particular use of the sea, food, drugs, minerals waste disposal, recreation, transportation, weather prediction, defense, education or science.

Rather for many years I personally have viewed the sea and its contents as a complex and many faceted but essentially single resource, which lends itself to all of the many uses which I have just mentioned as does the terrestrial environment but like the terrestrial environment is in jeopardy because of overexploitation by some users, underexploitation or outright neglect by other potential users, conflicts among uses and among users everywhere being resolved more by accommodation to the pressure of special interest groups than to a management rationale which is clearly expressive of the national interests.

This viewpoint of the sea as a single resource I think is shared by many others. It was implicit I believe, Mr. Chairman, in the 1959 report the National Academy of Sciences Committee on Oceanography which in a sense 10 years ago led off the inquiry that we are engaged in today.

I know it was explicit in the ICO Long-Range National Oceanographic Plan entitled Oceanography—the 10 Years Ahead, which was published in 1963 and in which I had a hand.

It has pervaded the hearings of this subcommittee I believe since its establishment in 1959 and most particularly it was evident in the hearings conducted during August of 1965 which led to the establishment of the Marine Council and the Commission.

The three annual reports of the Marine Sciences Council also express this point of view I believe and finally it receives its most impressive documentation to date in the Commission report which we are reviewing now.

Briefly stated I think it boils down to a statement that, although budgetary starvation or undernourishment of many if not most of the U.S. marine activities has been generally cited as an important contributory cause to the generally unsatisfactory state of our marine posture, these 10 years of study by a wide variety of highly qualified groups has identified the fragmentation of the effort and the lack of a central authority with overall responsibility for the harmonious and

balanced development of the various uses of the sea as the key and primary problem needing solution.

Therefore, I would like to focus my remarks today on the Commission recommendations in chapter 7 for an independent agency reporting directly to the President and intended, to use the Commission's words, "to provide the means for undertaking the full range of actions needed to realize the Nation's growing stake in the effective use of the sea."

Having commented on chapter 7 and the organizational recommendations, I would like then to come to what in my opinion is the most urgent management problem demanding the attention of such an agency, namely heading off an impending environmental crisis in the coastal zone.

This you will remember is discussed in chapter 3 of the Commission's report. Finally if there is time I would like to comment briefly on the Commission's recommendations for global environmental monitoring and prediction as developed in chapter 5.

So let me turn now to the question of Federal organization. As I have already said I consider the question of Federal organization the most important issue bearing on effective use of the sea facing the Nation today.

Fortunately, it is one that the Commission has dealt with extremely well, and I cannot find fault with either the rationale, the analysis, nor the recommendations that stem from them. In fact, I should like to indicate my admiration for, as well as my endorsement of, the material in this section of the report.

I would like to say more. It is my opinion that if the recommendations of this chapter were the only recommendations of the report adopted by the Federal Government, all the remaining recommendations in the other chapters that were sound would ultimately be adopted as a consequence of this one.

Conversely, without such an agency, and the corresponding modifications of the committee structure of Congress to simplify the jurisdictional oversight, the other recommendations of the report, however desirable and important, would remain in jeopardy.

I bear in mind that the entire Federal executive structure is under review, and that major changes may be in the making over the next several years. In my opinion, the formation of NOAA as an independent agency should not wait for this larger review and possible overhaul of the Federal structure. The Commission report provides adequate and persuasive reasons for thinking that whatever the ultimate Department structure, the activities proposed for consolidation in NOAA belong together under a single administrator, and that this consolidation is already long overdue.

Whether NOAA would continue as an independent agency or be placed ultimately under some supervening departmental structure is a second-order question that need not be answered now. The decision to establish NOAA, however, I believe cannot wait.

To come to matters of detail, I have in the past favored a somewhat more inclusive grouping of agencies than the Commission proposes for NOAA. My reasoning started with a concept of the functions to be performed by such a new agency and its consequent internal organization to exercise these functions.

For the present I do not wish to detract from the specific recommendations of the Commission by bringing in these details because in my opinion the recommendation of the Commission does adequately indicate the key agencies involved and will provide a desired core to which other activities could be added later should further consideration show there is merit in doing so.

Let me turn now to the question of the management of the resources of the coastal zone. For the last 2 years (1967, 1968) I have chaired the Marine Council's Consultant Panel on Multiple Uses of the Coastal Zone. Currently, the Travelers Research Corp. is working with the Nassau-Suffolk Regional Planning Board of Long Island on improved planning and management of Long Island's marine resources. I am also a member of NSF's Sea-Grant Consultant Panel.

These three activities have served to reinforce my earlier conviction that, although our total environment is suffering from the threefold pressure of population growth, urbanization, and industrialization, the coastal portion of that environment is in greater jeopardy than the rest. It is here that all pressures reach their peak intensity and conflicts among competing uses are most serious.

To use the words of the Commission :

The coast of the United States is, in many respects, the Nation's most valuable geographic feature. It is at the juncture of the land and sea that the greater part of the Nation's trade and industry takes place. The waters off shore are among the most biologically productive regions of the Nation.

Furthermore, I agree with the Commission's assessment that, to use their words:

Rapidly intensifying use of coastal areas already has outrun the capabilities of local governments to plan their orderly development and to resolve conflicts. The division of responsibilities among several levels of government is unclear, and the knowledge and procedures for formulating sound decisions are lacking.

That is the end of the Commission's statement in this regard.

Finally, I concur with the Commission's conclusion that :

The key to more effective use of our coastland is the introduction of a management system permitting conscious and informed choices among development alternatives, providing for proper planning, and encouraging recognition of the long-term importance of maintaining the quality of this productive region in order to ensure both its enjoyment and the sound utilization of its resources. The benefits and the problems of achieving rational management are apparent. The present Federal, State, and local machinery is inadequate. Something must be done.

The proposal that follows this statement of the problem in the Commission report is, to me, the boldest, most imaginative, and most far-reaching recommendation in the entire report. It is likely, also, I believe, to be the most controversial. It is, you recall, as follows:

The Commission recommends that a Coastal Management Act be enacted which will provide policy objectives for the coastal zone and authorize Federal grants-in-aid to facilitate the establishment of State Coastal Zone Authorities empowered to manage the coastal waters and adjacent land.

I cannot better the Commission's presentation of the nature of the coastal zone, its description of increasing multiple-use conflicts and their potentially disastrous consequences, nor can I better its development of the appropriate role and implementing activities of the coastal zone authorities.

In particular, I think its emphasis on the States as the focus for responsibility and action is perceptive and wise, as is its specification of the Federal role as that of assistance and support in the development of State coastal zone authorities.

And, of course, the Federal role includes also the protection of the national interests in the coastal zone.

Finally, I concur with the identification of the Great Lakes as urgently in need of special attention, and I agree that work toward the restoration of the water quality of the Great Lakes should be an urgent national commitment.

You remember the Commission proposes a Great Lakes restoration feasibility test national project as a step in this direction, and I endorse this particular national project also.

So much for my feelings for the Commission's recommendations on the coastal zone authorities.

I would like to turn briefly to the related proposals of the Commission concerning coastal zone laboratories. This discussion occurs mainly in chapter 2. I agree with the Commission that the coastal States, whether or not they establish formal coastal zone authorities do now and will continue to need access to research centers specializing in the solution of local and regional problems associated with the use or misuse not only of the marine environment but of the entire environment.

I also agree that, where the marine environment is concerned, the Sea Grant program is an appropriate vehicle for establishing and supporting such laboratories or centers. I worry about three aspects of the Commission's treatment of this subject, however.

First, the Commission is silent concerning the rationale for determining the number and location of coastal zone laboratories, except to state that they should be local and regional and in conformity to the local and regional differences in the nature of the problems to be solved.

In the absence of a clearer criterion, however, it will be all too easy to conclude on purely political grounds that there should be at least one coastal zone laboratory in every coastal State.

On this basis, unless funding is very generous, the chances are that a number of these, and perhaps all of them, will be "subcritical" in size and, hence, too small to mount effective programs.

This particular criticism of subcriticality and inability to mount effective programs the Commission itself has leveled at the Federal in-house research laboratories and this criticism led the Commission to its recommendation that the Federal in-house laboratories be consolidated into a smaller number of stronger centers.

I feel that to avoid future criticism of coastal zone laboratories of a similar nature, the location and number problem should be subjected to further study. This might be an appropriate responsibility of the sea-grant program staff.

My second misgiving has to do with the explicit recommendation that such laboratories be established only in association with academic institutions. The same recommendation appears with regard to the proposed University-National Laboratories, and the statement is made that the Federal in-house laboratories be encouraged to acquire such university associations, too.

I see no reason why multidisciplinary applied research with a management or action orientation cannot be carried out in a university setting.

In fact, the sea-grant program is already beginning to produce considerable headway in this direction in its institutional grants program. However, it is uphill work against a long established tradition of discipline-orientation, departmental autonomy, and professorial independence.

There are a number of independent research centers around the country in addition to my own with capabilities for multidiscipline applied and decision-oriented team research of a high order. I would hope that these would not be precluded from playing a role where their capabilities warrant.

My third misgiving has to do with what appears to be a gap in the proposed applied or management-oriented research activities specifically related to the marine areas outside the coastal zone.

Multiple-use problems are, as the Commission itself says, moving rapidly seaward. They are most intense in the coastal zone but they are extending seaward and they encounter there the operations and interests of other nations on the way.

The kind of basic research presently being carried on by Scripps, Woods Hole, and Lamont, which institutions are cited by the Commission as prototypes of a family of university-national laboratories it advocates, is of vital importance to the Nation and I am not downgrading it. I support the Commission's interest in it. By itself, however, it does not meet the need.

In my opinion the new agency will need far more practical studies in which economic, social and political factors are examined as well as scientific and technical ones. I would like to point out that the sea-grant program, as originally conceived and presently administered, aims at providing a use- or management-oriented program of research, education, and services concerned with improved management of marine resources wherever they happen to be.

In short, I would not like to see the sea-grant program reduce its focus to the coastal zone only. Nor would I like to see the university-national laboratories forced to turn their attention away from basic and toward applied research.

I do not believe the Commission intended either of these things to happen. I would be happier with this section of the report if it had recognized that the appropriate distinction between its proposed university-national laboratories on the one hand and sea-grant college programs on the other was not the portion of the marine environment being studied, which is the way the Commission appears to divide responsibilities but rather the objectives and rationale of the research.

The National Laboratories should aim at a more profound understanding of fundamental marine phenomena and processes. Sea-grant studies should aim at fostering better management decisions concerning the uses of the sea.

With this rationale for the sea-grant studies the coastal zone laboratories could be seen as one component of the larger sea-grant program singled out for emphasis at this time because of the urgency of the management problem in the coastal zone.

My final comments have to do with chapter 5, the global environment and in particular the portion of that which refers to monitoring and predicting weather conditions. I read this chapter with special interest because I have come to believe over the years that monitoring and predicting medium- to long-term changes in weather, climate, and the ocean is becoming more urgent every year.

Modification of weather and ocean conditions by interference with natural environmental processes is a growing reality, which the Nation is only beginning to confront.

Waste products are being poured into the air and the sea in ever greater amounts. These waste products have immediate as well as lingering consequences and among the more portentous lingering consequences may be the planetary warming which some scientists expect as a result of carbon dioxide accumulation in the atmosphere.

Others acknowledge the shadowing effects of particulates which are also accumulating in greater amounts. This might lead to a long-term cooling also with portentous implications over time.

I think it is a cause for regret and self-criticism by the scientific community that even the sign, plus or minus, warming or cooling, of such long-term climate changes is not really determinable on the basis of present knowledge.

I think it could be determined and perhaps even its rate estimated if sufficient effort, and this does not mean large effort, were directed toward developing the capability for monitoring and predicting long-term climate changes.

In general, everything in the chapter on global environment depends upon the availability of more, and more adequate, data. Almost all the activities reported in that section are data-limited and I think the Commission's recommendations on global monitoring and prediction are very important and underlie most of the scientific work which is described there.

In particular the international framework for such monitoring and prediction activities is I think important and I think the Commission's recommendations for collaboration with the World Weather Watch, the so-called IGOSS program and the global atmosphere research program are sound and perceptive.

In a very brief summary, Mr. Chairman, I have tried to emphasize the positive rather than the negative in this critique I have focused on those portions of the report that seemed to me most directly related to advancing the whole national interest in the marine area rather than some component of it.

I understand the national interest to be more pragmatic than philosophical. I believe it has economic, political and military payoffs uppermost in mind and that it evaluates these in the context of the world power balance among nations.

In the pragmatic light of these national policy considerations, I consider the Nation's renewed interest in the sea and the attention of this committee most auspicious. I have emphasized first and foremost the importance of the organizational recommendations of the Commission, in particular the recommendation that a new agency be formed.

In the Commission's words:

The overriding consideration is that only through creation of a major marine agency with attendant atmospheric responsibilities can a national effort be launched. Because of the importance of the seas to this Nation and the world, our Federal organization of marine affairs must be put in order.

One very short, final comment. In moving to advance scientific understanding and the practical uses of the sea, we and other developed nations face an unprecedented opportunity.

This opportunity is to organize our efforts jointly for the benefit of all by accepting the sea as everyone's resource and affirming that joint custodianship for mankind is a practical as well as moral imperative.

The alternative, an intensifying competition over these uses as technological capability and the perception of the sea's importance both grow, seems ominous in this age of nuclear weapons.

In either case, our approach to marine affairs needs to utilize our best minds and widest national capabilities if we are to measure up to the challenge ahead.

This completes my statement, Mr. Chairman. I would be glad to discuss aspects of it.

Mr. LENNON. Thank you very much, Mr. Brooks.

Mr. Pelly.

Mr. PELLY. Mr. Brooks, when did the Travelers Insurance Co. establish the Travelers Research Center?

Mr. BROOKS. The Travelers Research Center was established late in 1960, Mr. Pelly, as a nonstock, nonprofit corporation with the purposes that I have described.

Last year, late in 1968, the program carried out by the Travelers Research Center had expanded to such an extent that working capital was short. Working capital is hard to come by in a not-for-profit, nonstock corporation. The Travelers Research Center at that time in 1968, had a wholly owned subsidiary of its own, a stock corporation.

The solution to our investment capital shortage was achieved by having the subsidiary purchase the bulk of the activities of the research center and then itself in turn be purchased by the Travelers Corp., as a wholly owned subsidiary.

That move was made in December of 1968.

Mr. PELLY. The motivating power back of the creation of the center and the subsidiary I presume was that by research and improvement in the quality of the environment actually the insurance industry would indirectly and perhaps in some measure benefit. Is that correct?

Mr. BROOKS. That is very well put, Mr. Pelly. That is precisely the motivation as I have always understood it and it is still the motivation although we are a stock subsidiary of the Travelers Corp.

In amplification of the point that you have just made you may be interested that for 3 years the Travelers Corp., funded a broad-scale, long-term oriented basic research program in the old Travelers Research Center aimed at more effective management and problem solving with regard to a wide variety of environmental problems.

That support averaged over a half million dollars a year during those 3 years. The culmination of that program—also at the end of 1968—was a conviction that I had and many of my senior colleagues in the Travelers Research Center had and which was shared by the

Travelers Corp., that that broad-scale basic fundamental effort to better understand the environment and its reaction to the pressures put upon it deserved more than just a part in a larger corporation. It deserved a corporate vehicle of its own.

Therefore, at the same time that we established the applied research activity as a subsidiary of the Travelers Corp., we established a third corporation, nonstock, independent, not for profit, and we hope tax exempt, called the Center for Environment and Man.

This corporate vehicle will be the agency carrying on the basic research portion of the family of environment studies that we had always pursued.

Mr. PELLY. Have you had any Federal grants or assistance in your research activity?

Mr. BROOKS. Yes, indeed. The bulk of our support has come from Government organizations. ESSA has provided us with some support, the Department of the Interior with support, the AEC with support. NASA has supported us.

Our support is spread across quite a wide spectrum of Government agencies. The environment as you are aware touches almost every function that Government is interested in, including housing, transportation, waste management, and the like.

Mr. PELLY. Does your program contemplate at all actually performing construction work in improving the environment or is it limited to research and planning and advising?

Mr. BROOKS. We limit ourselves quite consciously to these latter functions, Mr. Pelly. We feel that this has two advantages. One, it makes it easier for us to maintain our stock in trade, which is objectivity, since we have no hardware or engineering interests to serve. Secondly since it does call for quite a different cast of characters to carry system design—for example, into the engineering and implementation phase—we are spared the problem of integrating such people into an already rather diversified staff.

We are quite satisfied with doing effective work in the planning, system design, and advisory role. That has been our role and will continue to be our role.

Mr. PELLY. I must say that I think it very encouraging to know taking these steps that Travelers has taken to try to meet something is important to them and to the people they do business with and are taking these steps that Travelers has taken to try to meet something of the problem that exists.

I think your presence here today is most encouraging. I was not aware of the work that is being done in this field. I can see that you have read this long Commission report very carefully and you have confined your comments to the areas in which you feel that you can contribute.

I have enjoyed your testimony and I wish that it were true and maybe it is that more segments of private industry are interesting themselves in improving the conditions that, after all, civilization and the population explosion and industrialization are creating.

I want to personally thank you for your very fine statement and your presence here today.

Mr. BROOKS. You are very kind. Thank you.

Mr. LENNON. Thank you very much.

Mr. Downing.

Mr. DOWNING. Thank you, Mr. Chairman.

I think you have made an excellent contribution here, Mr. Brooks. I would hope that you are going to furnish us with copies of your statement so that we can study it later.

Is that correct?

Mr. BROOKS. Yes; I certainly shall and I am sorry I didn't have them today.

I realize it was rather dense and concentrated and it may have been hard to listen to.

Mr. DOWNING. You didn't mention in your testimony anything about the grouping of the Federal agencies which go to form NOAA. Do you have any comments on that?

Mr. BROOKS. Well, yes.

The point I made at that portion of my testimony was that I think it is more important to support the Commission's recommendations, including the particular grouping which they propose, than to detract from the clarity and support that that recommendation would otherwise enjoy by raising second order questions about whether the Lake Survey should or should not be there, whether if the Lake Survey is there the Geological Survey or part of it might not be, and so forth.

I didn't wish to get into the details of that particular grouping. I think the grouping as presented, as proposed is entirely adequate to the purpose.

Mr. DOWNING. Thank you very much.

Mr. LENNON. Mr. Brooks, I would have to say that any reasonably informed person or a person who had been exposed to any of the things that we have been discussing here since 1959, would have to say that he was greatly impressed by the strength of your statement.

It does, I am sure, represent a study in depth and long consideration of the Commission report. I don't think anyone would dare say that that was not a fact.

Mr. BROOKS. Thank you, sir.

Mr. LENNON. I commend you for it.

You will timely furnish the members of the committee the statement that you made today or a sufficient number to be distributed among the total membership of the subcommittee. Could you also furnish us a statement of your biographical background, please, sir?

Mr. BROOKS. Yes; of course.

Mr. LENNON. Because I think that necessarily we would have to understand that to be able to partially understand your deep interest in the subject matter.

Incidentally, I would like to suggest, Counsel, that you put in the hands of each member of the subcommittee a copy of Mr. Brooks' statement and his biographical data and also the statement that was made by the witness here yesterday which I was not privileged to hear.

I understand it was not necessarily exactly like yours but went in depth, too, with respect to his views on the Commission report. I don't know what to say to you except that I certainly subscribe to your general statement that it would be a mistake for the committee to try to make individual evaluations of each of the various Government agencies that the Commission projected to go into the Government structure known as NOAA.

If we did we would soon be more splintered than we are now. I liked your comment with respect to the consideration of the reorganization related to any action that the Congress might ultimately take in implementing the Commission's report as it is related to a Government structure.

As most people know, two of necessarily the principal components of the Department of the Interior which are recommended to go into NOAA are under the jurisdiction of this particular committee and under the jurisdiction of a distinguished subcommittee of which I happen to be a member but not the chairman.

Another point recommended by the Commission's report with respect to what should go into NOAA is under the Department of Transportation, specifically the Coast Guard.

This committee likewise has legislative jurisdiction of the Coast Guard and more particularly of the Subcommittee on Coast Guard of which I happen to be a member but not the chairman, and so it goes.

So we don't necessarily have conflicts of interest in this committee, but we do have conflicts as to questions of legislative jurisdiction and these matters will have to be resolved if and when there is a Government structure because I can't think of anything that ought not to happen more than decimation of the legislative committees that might be related to a Government structure.

I think what we are going to have to come to, Mr. Pelly, if we ever move completely in the direction with respect to a Government structure as recommended by the Commission is a reorganization of committees that would have jurisdiction over this Government structure.

Mr. PELLY. Mr. Chairman, if I might comment on that.

Mr. LENNON. It is something that is going to give us concern.

Mr. PELLY. I have come to the conclusion that we ought to avoid congressional legislative jurisdiction and not touch it because if we do we are doomed, this program is beaten.

I went before the Rules Committee on a bill that we reported out from the Merchant Marine and Fisheries Committee having to do with a council of advisers to the President on environment, and immediately the chairman of another committee, a great committee, came in and said his committee had jurisdiction over some of the resources that would be covered by that program, and while he had waived jurisdiction over the bill, he didn't think that it should be reported to the House.

Here is one of the most important subjects. I don't think it makes any difference what committee has legislative oversight myself because it is so important. Nevertheless, the fact is that there is a jealousy over legislative oversight and I think this committee ought to go ahead and establish an agency and forget about where the chips fall and let each committee handle their jurisdiction and then bit by bit eventually these matters can be settled.

In our committee we can do that.

Mr. LENNON. That is the reason I studiously avoided this question but happily most of those parts of the agencies that would go on to NOAA are within the jurisdiction of the Merchant Marine and Fisheries Committee. That is the one consolation we can get out of this thing in hoping that we may meet this criticism in the future.

Mr. Brooks, we thank you again for your appearance.

I want to say that I regret that so many members of the committee were not here to have the opportunity to hear both you and the witness who preceded you. They are excellent statements and provide food for a great deal of thought and consideration.

Counsel.

Mr. CLINGAN. I have one or two questions, if I may.

Mr. LENNON. Yes.

Mr. CLINGAN. Mr. Brooks, I think it might be helpful for the members at this point if they realized that your company probably has particular expertise in understanding the overlaps and conflicts in Government organization. It may make your comments with regard to a national agency more meaningful.

If my memory serves me properly, wasn't one of your research projects a national data buoy program for the Coast Guard?

Mr. BROOKS. Yes, we are the Coast Guard's prime contractor for the feasibility requirements and cost-effectiveness portions of that study.

Mr. CLINGAN. That was a study that led you across many agency lines, was it not?

Mr. BROOKS. Exactly. The Coast Guard is a lead agency for a wide number of Federal agencies with regard to this national program.

Mr. CLINGAN. This, then, gave you the opportunity to see how many organizational conflicts there were in that study?

Mr. BROOKS. Yes.

I might say that it led us to recognize that the lead agency concept is not in itself an entirely satisfactory solution toward developing national programs of that sort. In particular, a lead agency must rely on other agencies for the budgets which it spends presumably on their behalf. Budgetary support by a multiagency consortium is likely to be interrupted or discontinuous. For a program of the sort we have been engaged in thus can be disastrous by destroying the continuity and effectiveness of the research effort.

Mr. CLINGAN. As a matter of fact, this program which is one of the national projects recommended by the Commission is at present, even though it is under the aegis of a lead agency, suffering from what you refer to as budgetary starvation, is it not?

Mr. BROOKS. Yes.

Mr. CLINGAN. You could say that this is an additional argument for putting together a stronger national organization?

Mr. BROOKS. A stronger national organization with responsibility for that program I think would have a better chance of avoiding both starvation and periods of glut followed by starvation which are so very disruptive.

Mr. CLINGAN. With regard to coastal zone authorities and coastal management, in which you have a lot of experience, I would like to get your opinion. How would you define as the coastal zone?

I am sure you realize that in drafting coastal zone legislation, it will be very difficult to define the jurisdiction that the authority should have, how far inland it should go, and for what purpose it should go.

Mr. BROOKS. In this connection I think the Commission's suggestion is extremely good. They suggest an outer boundary which is the territorial sea, which is at present a 3-mile extension to seaward from the low watermark.

Landward they recommend that each State define for itself the landward extension of the coastal zone if you recall. They dodge the issue for very practical reasons and I would support their formula for equally practical reasons.

I think it is something which would require special consideration in each locality. If the States are to operate such authorities I think the State should determine its landward jurisdiction.

Mr. CLINGAN. You would favor then establishing the authority and let the authority study the problem itself?

Mr. BROOKS. Yes.

Mr. CLINGAN. With regard to the coastal zone laboratories you very astutely, I think, pinpointed the lack of criteria for establishing the number and location of the coastal zone laboratories.

Have you any criteria that you would suggest?

Mr. BROOKS. I think that if it were possible to establish what some people call a problem-shed, a definition with an analogy to a watershed, that is, a geographical region which is equally affected by a given coastal zone management problem, that this ought to be taken into consideration.

Having at least examined the feasibility of using such a problem-shed criteria, then one would, of course, immediately have to go to the political jurisdiction to see whether there were jurisdictional conflicts which would dominate or which could be submerged in the problem-shed definition.

This is not unprecedented. In fact, the National Agency for Air Pollution Control of the Public Health Service is defining air pollution control regions in precisely this way or attempting to, outlining the region for an authority to assume jurisdiction over on the basis of a shared problem which is fairly uniformly felt throughout that region but which is not strongly felt outside of the region.

Mr. CLINGAN. I have just one final question.

Would you personally prefer that these criteria should be legislatively developed or do you prefer to leave them to administrative decision by some entity such as the sea grant program?

Mr. BROOKS. I really don't have a feel for that.

Mr. PELLY. I might comment that, if you were to do it legislatively, if you put one in every congressional district on the coast I think you would probably get it by, but I think it would be more practical to leave it up to some other authority to establish those because the politics of the situation might not work in the best manner.

Mr. LENNON. I think the gentleman will recognize that if it isn't done by legislation it will be done by political manipulation at the executive level. So what is the difference. As I understood you to say, sir, you said that your research center had a contract with the Department of Commerce related to the Environmental Sciences Services Administration?

Mr. BROOKS. Yes. We have several such contracts.

Mr. LENNON. And I think you said you had a contract with the Department of Transportation related to the Coast Guard?

Mr. BROOKS. Yes, indeed.

Mr. LENNON. For the National Buoy System. I think you said you had a contract with the Department of Interior, right?

Mr. BROOKS. Yes.

Mr. LENNON. That is related to the Bureau of Commercial Fisheries or Sport Fish and Wildlife Division or Mining?

Mr. BROOKS. No, the contract I was referring to was with the Office of Water Resources Research.

Mr. LENNON. So in spite of the fact that your research center has contracts with the Department of Commerce which has jurisdiction, of course, over the Environmental Sciences Services Administration, which the Commission recommends go into the new Government structure NOAA, and in spite of the fact that you have a contract with the Department of Transportation which has jurisdiction over the Coast Guard, which is likewise recommended to go into NOAA, and in spite of the fact that you have a contract with the Department of the Interior and the Commission report recommends that the Bureau of Commercial Fisheries and certain aspects of the Bureau of Sport Fisheries and Wildlife go into the Government structure, you are here recommending that we follow the recommendations made by the Commission with respect to the agencies that should go into NOAA and for that I want to commend you for your courage.

Not many research centers subject to Government grants would be so courageous. That is the way I want to hear a man talk.

Mr. BROOKS. Could I make a couple of points on that?

Mr. LENNON. Yes.

Mr. BROOKS. I don't wish to claim that courage is the issue here. The organization which I head receives its support I believe on the basis of our scientific competence and objectivity including objectivity with regard to organizational management and policy problems.

Therefore, I think in fact that I am merely being consistent—

Mr. LENNON. I think you are, too.

Mr. BROOKS (continuing). With our stock in trade in taking this point of view.

Mr. LENNON. I think you are, too. I want to compliment you because there are not many private research centers that would come before a committee and recommend something that could have an adverse impact in the future with respect to Government contracts. You have done that, and I commend you for it.

I wish other people were more objective and more courageous.

Coming now to the question of the coastal zones, that as you have indicated is a most complex subject. I believe up in New York State and in the Long Island section the various incorporated towns own the estuary and marshland off their shores; is that true?

Mr. BROOKS. I believe that is so.

Mr. LENNON. I recollect it because I visited up there.

In some States the State has the fee simple title to all the marshlands regardless of where they might be located. Such is true in North Carolina if they are not owned by the individual under a king's grant and have not subsequently been sold by the State board of education in which title lies.

I know something of the problem that you had up in New York State and Long Island land and I understand this is true in Connecticut, too.

Does the State of Connecticut own the marshland off its shores or

does the individual corporate political subdivision claim title to marshlands contiguous to their boundary lines?

Mr. BROOKS. I don't have that information at my fingertips. My impression is that it is the local jurisdiction which owns it.

Mr. LENNON. Which does create a problem with respect to the utilization or private development of those.

Mr. BROOKS. It is one measure of the profundity of the Commission's recommendations that it raises such questions.

Mr. LENNON. How would you go about divesting title in the political subdivisions of the State of New York and the State of Connecticut to their land beyond the high water mark, out seaward. How would the State of Connecticut and the State of New York divest the political subdivision?

Mr. BROOKS. I really don't know enough about the legal machinery and the basis for such ownership to answer that, Mr. Chairman. My suspicion is that one might have to go right back to the constitution of the State, the charter of the State to rectify that.

Mr. LENNON. These are the problems we are involved in now in all the coastal areas. I think in 1890 the Congress gave the Corps of Engineers the responsibility and authority for granting dredging permits if the dredging would not interfere with or was a menace or a hindrance to navigation.

Mr. BROOKS. Which is interstate in its nature; yes.

Mr. LENNON. Now, I think sometime in early 1967 there was a memorandum of understanding executed between the Secretary of the Interior and the Secretary of the Army.

Now when a person applies for a permit to dredge from his own boundary line out to, say, the Atlantic Intracoastal Waterway and where it will help navigation, the Department of the Interior can reject the permit for the ultimate effect the dredging will have upon wildlife, shellfish, and the propagation of any type of fish.

It has been my experience that it cannot be resolved because as long as the Department of the Interior through their regional director says, "In my judgment this might have an adverse effect on oysters or any type of shellfish or propagation of any type of fish" the thing is just at a stalemate and the Department of the Army through the Corps of Engineers cannot go and get these people on the land.

They have king's grants out to the high water mark in front of their property, and they can't dredge so that they can get out with a little 10-foot rowboat because it might damage the ecology of the estuary.

So all these things are going to have to be resolved. How, I don't know.

I know the Legislature of North Carolina this last session appropriated a substantial amount of money for the State to acquire from private owners this property in order that it might be protected for the benefit of all the people related to the water use.

Every State has a different problem apparently from what I can find out. How it is going to be resolved I don't know. We don't want to get the Federal Government into this thing too far. You know what I mean.

There is enough hue and cry across the country now about the Federal Government running everything from Washington and that is almost true or at least it is the thinking of a great many people.

I have people write to me today and say, "I am complaining about my water rate and my sewage rate."

You say, "Why."

They say, "Well, the Federal Government made a grant for a water line or a sewer line out to the sewage disposal plant. Yet you sit in Washington and let the people here charge this outrageous rate and my money through Federal tax helped build this plant."

That is the complaint we get and it is typical of the views of our people.

Thank you for your appearance, Mr. Brooks and you, Mr. Flipse, too, for your splendid presentation. I am sure that counsel will be in touch with you from time to time to get your advice and help because we certainly need it.

This concludes the hearings until they will be resumed according to our schedule now, which I think has been approved, Mr. McElroy, beginning September 16 when we will have the privilege of hearing the Executive Secretary of the Marine Science Council and a number of Cabinet officers who certainly want to be heard and we are desirous of hearing them, too, with respect to their feelings on the Commission's report.

Thank you very much.

(Mr. Brook's statement follows:)

STATEMENT OF D. L. BROOKS, PRESIDENT, THE TRAVELERS RESEARCH CORP.

My name is Douglas L. Brooks. I am President of The Travelers Research Corporation, a self-supporting organization of about 200 people in Hartford, Connecticut, engaged in contract research and consultation for government and industry on problems relating to the use or misuse of the environment.

I am very pleased that you have asked me to comment on "Our Nation and the Sea," the report of the Commission on Marine Science, Engineering, and Research. It is, in my opinion, an extraordinary report in both quality and importance, and I welcome this opportunity to underscore the portions of it I feel most strongly about.

In doing so, I shall speak from a personal rather than a corporate viewpoint. Furthermore, I shall speak from the viewpoint of an outsider, or—to use a less modest term—a generalist. That is, I do not identify myself with any particular use of the sea, either for food, drugs, minerals, waste disposal, recreation, transportation, weather prediction, defense, education, or science. Instead, for many years, I have viewed the sea and its contents as a complex, and many-faceted but essentially single resource, lending itself to *all* these uses—as does the terrestrial environment—, but like it in jeopardy because of over-exploitation by some users, under-exploitation or outright neglect by others, and conflicts everywhere being resolved more by accommodation to the net pressure of special interest groups, on both a national and international scale, than by a management rationale clearly expressive of the national interest.

This viewpoint is, I know, shared by many. It was at least implicit in the 1959 report of the National Academy of Sciences Committee on Oceanography (NASCO) which in a sense led off the inquiry we are engaged in today. It was explicit in the Long-Range National Oceanographic Plan, "Oceanography—the Ten Years Ahead," published by the Interagency Committee on Oceanography (ICO) in 1963 and in which I had a hand. It has pervaded the hearings held by this Subcommittee since its establishment in 1959 and most particularly the hearings conducted during August of 1965. It received a strong boost in the PSAC Panel Report of 1966, "Effective Use of the Sea," in which I participated, and in the NASCO Report of 1967, to which I also contributed. The three

annual reports of the Marine Sciences Council express it, and finally it receives its most impressive development to date in the Commission Report we are reviewing today.

In brief, although budgetary starvation of many if not most U.S. Marine activities has been generally cited as an important contributory cause to the generally unsatisfactory state of our marine posture, these ten years of study by a wide variety of highly qualified groups has identified the fragmentation of the effort and the lack of a central authority with overall responsibility for its harmonious and balanced development as the key and primary problem needing solution.

I would like, therefore, to focus my remarks on the Commission recommendations (in Chapter 7) for an independent agency reporting directly to the President and, to use the Commission's words, "to provide the means for undertaking the full range of actions needed to realize the Nation's growing stake in the effective use of the sea."

Having done so, I would like then to come to what in my opinion is the most urgent management problem demanding the attention of such an agency, heading off an impending environmental crisis in the coastal zone. (Chapter 3).

Finally, if there is time, I should like to comment briefly on the Commission's recommendations for global environmental monitoring and prediction, as developed in Chapter 5.

Federal Organization

As I have already said, I consider the question of Federal organization the most important issue bearing on effective use of the sea facing the nation today. Fortunately, it is one that the Commission has dealt with extremely well, and I cannot find fault with either the rationale, the analysis, nor the recommendations that stem from them. In fact, I should like to indicate my admiration for, as well as my endorsement of, the material in this section of the report.

I would like to say more. It is my opinion that if the recommendations of this chapter were the only recommendations of the report adopted by the Federal government, all the remaining recommendations that were sound would ultimately be adopted as a consequence of this one. Conversely, without such an agency, and the corresponding modifications of the committee structure of Congress to simplify the jurisdictional oversight, the other recommendations of the report however desirable and important, would remain in jeopardy.

I am aware that the entire Federal Executive structure is under review, and that major changes may be in the making over the next several years. In my opinion, the formation of NOAA as an independent agency should not wait for this review. The Commission report provides adequate and persuasive reasons for thinking that whatever the ultimate Department structure, the activities proposed for consolidation in NOAA belong together under a single administrator, and that this consolidation is already long overdue. Whether NOAA would continue as an independent agency or be placed under some supervening departmental structure is a second-order question that need not be answered now. The decision to establish NOAA, however, cannot wait.

To come to matters of detail, I have in the past favored a somewhat more inclusive grouping of agencies than the Commission proposes for NOAA. My reasoning started with a concept of the functions to be performed by the new agency and its internal organization to exercise these functions. In particular, it seemed desirable to avoid creating a loose federation of quasi-independent fiefdoms made up solely of existing agencies amputated from their present departments. I should be glad to provide the Committee with the paper where these thoughts are developed. For the present, however, I do not wish to detract from the specific recommendation of the Commission, which does quite adequately include the key agencies providing a viable and desirable core, to which other activities could be added over time should further consideration show there is merit in doing so.

Management of the Coastal Zone

For the last two years (1967, 1968) I have chaired the Marine Council's Consultant Panel on Multiple Uses of the Coastal Zone. Currently, The Travelers Research Corporation is working with the Nassau-Suffolk Regional Planning Board of Long Island on improved planning and management of Long Island's marine resources. I am also a member of NSF's Sea-Grant Consultant Panel.

These three activities have served to reinforce an earlier conviction that,

although our total environment is suffering from the three-fold pressure of population growth, urbanization, and industrialization, the coastal portion of that environment is in greater jeopardy than the rest. It is here that all pressures reach their peak intensity and conflicts among competing uses are most serious.

To use the words of the Commission, "The coast of the United States is, in many respects, the Nation's most valuable geographic feature. It is at the juncture of the land and sea that the greater part of the Nation's trade and industry takes place. The waters off shore are among the most biologically productive regions of the Nation."

Further, I agree with the Commission's assessment that "rapidly intensifying use of coastal areas already has outrun the capabilities of local governments to plan their orderly development and to resolve conflicts. The division of responsibilities among several levels of government is unclear, and the knowledge and procedures for formulating sound decisions are lacking."

And finally, I concur with the Commission's conclusion that "the key to more effective use of our coastland is the introduction of a management system permitting conscious and informed choices among development alternatives, providing for proper planning, and encouraging recognition of the long-term importance of maintaining the quality of this productive region in order to ensure both its enjoyment and the sound utilization of its resources. The benefits and the problems of achieving rational management are apparent. The present Federal, State, and local machinery is inadequate. Something must be done."

The proposal that follows this statement of the problem in the Commission report is, in my opinion, the boldest, most imaginative, and most far-reaching recommendation in the entire report. It is likely, also, to be the most controversial. It is, you recall, as follows:

"The Commission recommends that a Coastal Management Act be enacted which will provide policy objectives for the coastal zone and authorize Federal grants-in-aid to facilitate the establishment of State Coastal Zone Authorities empowered to manage the coastal waters and adjacent land."

I cannot better the Commission's presentation of the nature of the coastal zone, its description of increasing multiple-use conflicts and their potentially disastrous consequences, nor its development of the appropriate role and implementing activities of the Coastal Zone Authorities. In particular, its emphasis on the States as the focus for responsibility and action is perceptive and wise, as is its specification of the Federal role as that of assistance and support in the development of State Coastal Zone authorities, and the protection of the national interests in the coastal zone.

Finally, I concur with the identification of the Great Lakes as urgently in need of special attention, and that work toward the restoration of the water quality of the Great Lakes should be an urgent national commitment. The Commission proposal of a Great Lakes Restoration Feasibility Test National Project is a step in this direction, and I endorse it in concept, also.

Turning briefly to the related proposals concerning Coastal Zone Laboratories in Chapter 2, I would agree that the coastal states, whether or not they establish Coastal Zone authorities, do now and will continue to need access to research centers specializing in the solution of local and regional problems associated with the use or misuse of the environment. I would also agree that, where the marine environment is concerned, the Sea Grant program is an appropriate vehicle for establishing and supporting such laboratories or centers. I worry about three aspects of the Commission's treatment of this subject, however. First, the Commission is silent concerning the rationale for determining the number and location of Coastal Zone Laboratories, except to state that they should be local and regional, in conformity to the local and regional differences in the nature of the problems to be solved. In the absence of a clearer criterion, it will be all too easy to conclude on purely political grounds that there should be at least one in every coastal state. On this basis, unless funding is very generous, the chances are that a number of these, and perhaps all, will be "sub-critical" in size and, hence, too small to mount effective programs. This is the criticism the Commission itself has leveled at the Federal in-house research laboratories, leading to its recommendation that they be consolidated into a smaller number of stronger centers. I feel that to avoid future criticism of coastal zone laboratories of a similar nature, the location and number problem should be subjected to further study. This might be an appropriate responsibility of the Sea-Grant Program staff.

My second misgiving has to do with the explicit recommendation that such laboratories be established only in association with academic institutions. The

same recommendation appears with regard to the proposed University-National Laboratories, and the statement is made that the Federal in-house laboratories be encouraged to acquire such university associations, too. I see no reason why multi-disciplinary applied research with a management or action orientation cannot be carried out in a university setting. In fact, the Sea Grant Program is already beginning to produce considerable headway in this direction in its institutional grants program. However, it is uphill work against a long established tradition of discipline-orientation, departmental autonomy, and professorial independence. There are a number of independent research centers around in addition to my own with capabilities for applied and decision-oriented team research of a high order. I would hope that these would not be precluded from playing a role where their capabilities warrant.

My third misgiving has to do with what appears to be a gap in the proposed applied or management-oriented research activities specifically related to the marine areas outside the Coastal Zone. Multiple use problems are, as the Commission says, moving rapidly seaward, encountering the operations and interests of other nations on the way. The kind of basic research presently being carried on by Scripps, Woods Hole, and Lamont, cited by the Commission as prototypes of a family of University-National Laboratories it advocates, is of vital importance to the nation, and I support the Commission's interest in it. By itself, however, it does not meet the need.

The new agency will need far more practical studies in which economic, social, and political factors are examined as well as scientific and technical ones. I would like to point out that the Sea-Grant Program, as originally conceived and presently administered, aims at providing a use or management-oriented program of research, education, and services concerned with improved management of marine resources wherever they are. I would not like to see the Sea-Grant Program reduce its focus to the Coastal Zone only. Nor would I like to see the University-National Laboratories forced to turn their attention away from basic to applied research. I do not believe the Commission intended either of these things to happen. I would be happier with this section of the report if it had recognized that the appropriate distinction between its proposed University-National Laboratories and Sea-Grant College Programs was not the portion of the marine environment being studied but the objectives of the research. The National Laboratories should aim at a more profound understanding of fundamental marine phenomena and processes. Sea-Grant studies should aim at fostering better management decisions concerning the uses of the sea. With this rationale, the Coastal Zone Laboratories could be seen as one component of the larger Sea-Grant Program singled out for emphasis at this time due to the urgency of the problem.

The Global Environment

I read Chapter 5, "The Global Environment," with special interest because I have come to believe that monitoring and predicting medium to long-term changes in weather, climate, and the ocean is becoming more urgent every year. As the Commission points out, "Modification of weather and ocean conditions by interference with natural environmental processes is a growing reality which the Nation is only beginning to confront." The pouring of waste products into the air and the sea has both immediate and lingering consequences, for example, including as a possibility planetary warming, due to carbon dioxide accumulation, and a rising sea level as glaciers melt or, if the shadowing effect of particulates in the air prevails, a long term cooling and possible growth of glaciers.

The Commission emphasizes the prospects of purposeful and beneficial weather, climate, and ocean modification. In either case, "environmental modification problems are inseparable from those of environmental monitoring and prediction." For this reason, as well as because the direct benefits to marine and shore activities of improved and longer weather and sea-condition forecasts seem so great, the Commission's recommendations on global monitoring and prediction are especially important. In particular, the international framework on which these recommendations are made is, I think, both sound and perceptive. The formation of NOAA would lend impetus to the program.

Conclusion

In this discussion, I have emphasized the positive, focusing on those portions of the report that seemed to me most directly related to advancing the national interest in the sea. I understand this interest to be more pragmatic than philosophical. It has economic, political, and military payoffs uppermost in

mind, and it evaluates these in the context of the world power balance among nations. In the pragmatic light of these national policy considerations, I consider the nation's renewed interest in the sea most auspicious.

The first and foremost recommendation concerns the organization of the new agency. To use the Commission's words, "The overriding consideration is that only through creation of a major marine agency with attendant atmospheric responsibilities can a national effort be launched."—"Because of the importance of the seas to this Nation and the world, our Federal organization of marine affairs must be put in order."

One final comment. In moving to advance scientific understanding and the practical uses of the sea, we and other developed nations face an unprecedented opportunity. This is to organize our efforts jointly for the benefit of all by accepting the sea as everyone's resource and joint custodianship for man as a practical as well as moral imperative. The alternative, an intensifying competition over these uses as technological capability and the perception of the sea's importance both grow, seems ominous in this age of nuclear weapons. In either case, our approach to marine affairs needs to utilize our best minds and widest national capabilities if we are to measure up to the challenge ahead.

Dr. Douglas L. Brooks is President of The Travelers Research Corporation of Hartford, Connecticut, a contract research organization working in the environmental sciences. He has been actively engaged in the fields of oceanography, meteorology and operations research and is the author of numerous technical publications. He received his B.S. degree in physics from Yale University, and completed his graduate work at the Massachusetts Institute of Technology, receiving both his M.S. and Sc.D. degree in meteorology in 1943 and 1948, respectively. From 1948 until joining Travelers Research in mid-1962, he served with M.I.T.'s Operations Evaluation Group, the principal agency conducting operations research for the U.S. Navy. During this time, he conducted studies in the field for a number of operating commands and published classified papers on many aspects of naval warfare. In 1954, he became a Deputy Director of the Operations Evaluation Group and in 1957 was appointed Director of Research for the associated Naval Warfare Analysis Group, conducting studies in support of the Navy's long-range planning staff. He has served as consultant to numerous agencies of government, including the Interagency Committee on Oceanography, the Office of Science and Technology, the National Science Foundation's Sea-Grant College Program, and the Marine Science Council, and has been active in various panels of the National Academy of Sciences, including the chairmanship of its Panel on Air-Sea Interaction. He is a charter member of the Marine Technology Society.

(Whereupon, at 12:20 p.m. the committee recessed, to reconvene at 10 a.m. Tuesday, September 16, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

TUESDAY, SEPTEMBER 16, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:20 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The meeting will come to order.

Ladies and gentlemen, today we resume hearings on the report of the Commission on Marine Science, Engineering, and Resources, "Our Nation and the Sea."

In addition, we have invited the witnesses to comment on H.R. 13247, a bill designed to establish a centralized agency for the management of the nonmilitary oceanic and atmospheric programs. This new agency, called the National Oceanic and Atmospheric Agency, would be complemented by a National Advisory Committee for Oceans and Atmosphere, which would have as its function a continuous review of our national policy.

In designing the proposed agency, the subcommittee has followed closely the recommendations of the Commission.

During the next few days of hearings, we will be privileged to receive the testimony of those departments and agencies most directly involved in or affected by the proposed transfers. We are aware that the task we have charged these witnesses with by asking them to comment on our bill is a difficult one.

We understand the predicament created by the fact that the Commission's report was referred by the President to his Advisory Council on Executive Organization. However, it is our understanding that it may be some time before that Council will be able to consider the report, and we feel that we can no longer wait in seeking a resolution of these pressing problems.

Accordingly, it has been our decision to move ahead at as quick a rate that is consistent with orderly process.

I am sure that the witnesses who appear before us representing the agencies concerned, being as dedicated to the national interest as we all are, will be constructive in their comments, to the end that we will develop the most beneficial national policy and program possible for the oceans and the atmosphere.

Our first witness today is one who is particularly well qualified to establish a framework for the discussion that will follow. We welcome

Dr. Edward Wenk, Jr., executive secretary of the National Council on Marine Resources and Engineering Development.

For the benefit of those who are here who might not know, and I am sure everyone here does know, Dr. Wenk served as executive secretary of the National Council on Marine Resources and Engineering Development, which council was created by an act of Congress, and he very shortly thereafter became executive secretary to the National Council under the former administration.

Through the nonpartisan effort of the members of this committee in a letter addressed to the then President-elect Mr. Nixon, we requested that his splendid services be retained by the National Council under the new administration.

Dr. Wenk, we are delighted and honored to have you here. I understand that your statement is approximately 25 pages. I don't know how long it would take you to cover that. I have reviewed it and find that your real statement to the matter that we are concerned with begins on about the middle of page 18. Nevertheless, we think it is advantageous to all of us, and I hope we will have the time, for you to go through it in its entirety and still leave us a little time for you to answer some questions.

Thank you, sir. You may proceed.

STATEMENT OF DR. EDWARD WENK, JR., EXECUTIVE SECRETARY, NATIONAL COUNCIL ON MARINE RESOURCES AND ENGINEERING DEVELOPMENT

Dr. WENK. Thank you very much.

Mr. Chairman and Members of the Subcommittee on Oceanography:

Thank you for your kind words and for your encouragement on my presentation here this morning. It is a great privilege to be here before this committee today to discuss "Our Nation and the Sea," the final report of the Commission on Marine Science, Engineering, and Resources.

If I may, I would like to read the statement, although I think I understand your comment about the peak in interest beginning about page 18, but I believe the background contained herein may be helpful in both setting the stage for questions you may ask and also permitting this witness to develop a consistency in the comments that flow in the testimony.

The Commission's comprehensive, thoughtful analysis of our Nation's stake in the oceans provides a valuable guide to possible next steps if we are to utilize the seas more effectively and more intelligently for the benefit of mankind. As you evaluate their recommendations, I hope that these brief comments from my vantage point as executive secretary of the Marine Sciences Council may prove useful.

To put the Commission's report in perspective, I should like to trace the evolution of marine science affairs during the last 10 years, discuss the Commission's findings, its limitations and its implications for the future, and describe some of the actions being taken in the executive branch relating to its findings.

OCEANOGRAPHY COMES OF AGE

For a Nation with such strong maritime origins, it is a paradox that America's interest in the sea has periodically waxed and waned. Re-

search in oceanography peaked during World War II from demands of submarine warfare. It then again subsided.

In 1959, the National Academy of Sciences, after two previous unsuccessful attempts, reawakened our Nation to the contrast between the support for study of the sea and its potential. In response, Federal investments during the early 1960's began to increase, especially to strengthen research, manpower, ships and facilities.

While such developments were essential to underpin healthy growth in this field, by themselves they proved inadequate. The Congress after a long inquiry passed Public Law 89-454, the Marine Resources and Engineering Development Act, which explicitly set forth congressional views of the President's responsibility for leadership and steady influence for marine science activities carried on as parts of the missions of 11 Federal departments and agencies.

The act also set forth an unprecedented statement of national purpose. That mandate together with a vice-presidentially chaired Council to advise and assist the President, helped extend interest in scientific oceanography that was motivated largely by random curiosity into activities that related the oceans to people and their concerns.

Four circumstances had separately occurred to spur this new outlook, and in a sense to force oceanography to come of age:

First, concern was growing about the role of the oceans in national defense.

Second, we recognized that marine resources could help meet our Nation's and mankind's most pressing economic and social needs.

Third, powerful new marine technology was evolving that would make these aspirations possible.

Fourth, interest by other nations began to be manifested in potential benefits to be derived from the sea.

It is only 3 years since the Marine Sciences Act was signed. Ordinarily this would be considered a short time in affairs of Government to consider another major change. Yet your hearings this summer mark an inquiry that was anticipated by provisions of the act itself:

The act created the advisory Commission to look to the future and consider whether new policies or additional governmental machinery are needed to meet long-term needs and opportunities, and it authorized the Marine Council only as an interim body, so as not to inhibit options that might be considered by the Commission, and subsequently by the executive and legislative branches.

Vice President Agnew characterized the 1960's as a "Decade of Preparation," and the 1970's as the "Decade of Realization." In that context, the next few years thus become a critical fulcrum for portentous steps to meet the oceanic challenge.

THE DECADE OF PREPARATION

Any desire for greater accomplishment should not blind us as to how far we have come, and how weak and primitive were the beginnings of this endeavor.

During the Decade of Preparation, funding for research and exploration was increased by over a factor of five. We added 50 ships totaling 65,000 tons to our oceanographic fleet. Training and education of high talent were emphasized so that, compared to a decade ago,

10 times as many graduate students are enrolled today in oceanography and 6 times as many doctorate degrees are conferred annually.

The United States has clearly asserted a leadership in international circles that, before 1959, was in serious jeopardy. Moreover, our course during these 10 years has been steady. We were not lured into unproductive sideroads, but carefully assembled the tool kit for the longer pull ahead.

Apart from strengthening the research base during this decade there has been a second result—a broadening of perspective:

To study the potential of the sea to preserve world order, protect the environment and foster economic growth and well being:

To elevate concerns as to use of the sea to a higher policy level in the Federal Government; and

To bring these opportunities to a level of policy interest among industrial leaders, university presidents, State officials and statesmen throughout the world.

In other words, we have sought to understand, to manage, and bring to the service of man the forces generated by what Victor Hugo called "an idea whose time has come."

A NEW FOCUS ON BENEFITS DURING THE DECADE OF PREPARATION

The new governmental entity created during the latter part of the Decade of Preparation—the National Council on Marine Resources and Engineering Development—has sought energetically to carry out the purposes of the Marine Sciences Act. It has assisted the President to identify explicit goals from numerous and diffuse alternatives; to mobilize fragmented, and often dormant, resources into a coherent multiagency framework directed toward these goals. The Council has formulated priorities and associated plans for implementation.

The Council has thus deliberately, and I believe creatively, responded to the motivating factors mentioned earlier in relating the sea to the public weal. Subsequently, I shall elaborate on explicit Council actions to implement Public Law 89-454.

SCIENCE AND TECHNOLOGY TO REALIZE THESE BENEFITS

What makes this promise of the oceans so tantalizing is the third emerging influence on marine development—a modern science and engineering, that permits man to do the things on, in or under the ocean that he has long aspired to do, but been denied because of the severity of the marine environment.

To unlock mysteries of the ocean and chart its resources, scientists now have "leverage" of new technology: spacecraft and unmanned buoys to observe sea temperatures, currents and wave conditions, and worldwide systematic data transmissions to central data banks about sea conditions at the surface and above. We are also examining the role of ships of opportunity.

Below the surface, underwater television makes possible reconnaissance such as of the *Scorpion* wreckage in 14,000 feet of water; new coring techniques permitted the vessel *Glomar Challenger* to hold station in 11,720 feet of water, locating oil indications in the Gulf of Mexico.

EXPANDED INTERNATIONAL INTEREST

The fourth major development mentioned earlier is a sharply intensified global interest, and the Council machinery has endeavored to be responsive to this challenge. Approximately 100 nations front the sea. With new technology for exploration and exploitation, these nations are projecting their national interests seaward, conducting activities farther from their coasts.

As marine interests intensify and converge, the competition for resources, conflicts and debilitating rivalries potentially increase. International cooperation thus becomes essential.

In 1966, with explicit encouragement by the United States, the United Nations began to study questions of cooperation in research and exploration, of reserving the seabeds for peaceful purposes, and establishing guidelines for nations in the exploitation of seabed resources.

In 1968, the General Assembly created a 42-nation standing committee to discuss meaningful and workable principles to guide the international community in the marine environment.

In Geneva, the Eighteen Nation Disarmament Committee has recently been considering possibilities for seabed arms control. In that form, the United States proposed a treaty seeking to prohibit emplacement of nuclear weapons or other weapons of mass destruction on the ocean floor.

To foster research and exploration, the U.N. General Assembly moved in 1968 to strengthen the role of UNESCO's Intergovernmental Oceanographic Commission in coordinating research. It welcomed the U.S. proposal for an International Decade of Ocean Exploration as part of an expanded U.N. program of scientific exploration of the oceans and their resources.

At its fifth biennial session just last week, the IOC moved to outline the scope of such a program, to recommend the steps necessary to implement it, and especially to prepare the planning methodology and machinery to deal with such a program.

During this Decade of Preparation, this is the manner by which U.S. leadership sought to turn the growing international interest to constructive activity.

THE COMMISSIONERS AND THEIR REPORT

The next decade—a Decade of Realization—must take into account the problems of today, but it must plan for the benefits of tomorrow. The Commission on Marine Science, Engineering, and Resources has rendered to the President and the Congress a report replete with recommendations.

First, as to the Commission itself—their report is the product of perceptive endeavors of knowledgeable, distinguished citizens, aided by a capable staff. They represent not only expertise in marine science, per se, but others widely respected in education, business, law, economics, and government at National and State levels.

The Commission also had the benefit of advice from four Members of Congress, including the distinguished chairman of this subcommit-

tee, Mr. Lennon, and its ranking minority member, Mr. Mosher, and Senators Magnuson and Cotton.

Over 2 years of hard work, the Commissioners produced a mature analysis which I believe holds meaning for the entire Nation—for State governments local communities, industries and universities, as well as the Federal Government. "Our Nation and the Sea" should also prove of value to other nations that are considering their own role in the oceans.

LIMITATIONS TO THE COMMISSION'S REPORT

The Commission was confronted with an exceedingly wide range of subject matter, for almost every issue that is derived from a land activity has some counterpart at sea that was eligible for their consideration. As a consequence, they chose to limit the scope of inquiry by excluding certain areas. Questions of national security are not treated comprehensively, although the Commission insisted on the importance of marine science to the Navy and urged that Navy facilities be used for civilian purposes, and opportunities sought for civilian spinoff.

The complex questions of the merchant marine were excluded, although they discussed the need to study the Nation's port and waterway systems, and requirements for marine transportation services.

The Commission also decided not to go deeply into economics of marine resources although they recognize that in most instances resources extracted from the marine environment would be in competition with land sources and would be exploited only when the economics are favorable.

Parenthetically, I am pleased to report that the Council recently contracted with the Massachusetts Institute of Technology to supplement the Commission's study by an economic analysis of protein concentrates, coastal zone land, and waste disposal.

On their most controversial proposal—that on organization—the Commission recommended a National Oceanic and Atmospheric Agency as the organization arrangement best suited to implement the marine program and national goals it had set forth. However, there is little discussion in the report of alternatives considered and rejected, and the arguments for and against each alternative.

Finally, I would like to point out that the Commission did not set forth priorities.

There is also one potential source of confusion. Some Commission proposals are extensions, modifications, or refinements of already ongoing enterprises. The Commission report does not fully convey the magnitude of activities already underway in areas covered by Commission recommendations, and they did not state which are inhibited only by the present severe fiscal stringency.

ACTION BY THE ADMINISTRATION ON THE REPORT

Let me now discuss some of the actions on the Commission report that this administration has taken. Almost immediately after entering office, President Nixon asked Vice President Agnew and the Council members for recommendations on the Commission's proposals.

The Commission's 122 recommendations were reviewed carefully. Out of these, six programs areas were recommended by the Vice Presi-

dent for consideration by agencies when developing their fiscal year 1971 and future programs and priorities—Commission proposals which could be implemented, if merited and if within national priorities, without any major reorganization. These were:

1. To foster wise and productive use of coastal resources by (a) establishing a Federal grant program to encourage creation of State authorities for coastal area planning and management, (b) establishing coastal zone laboratories, and (c) planning regional port development.

2. To expand ocean exploration of coastal and deepsea resources and weather forecasting services to serve a wide range of public and private interests.

3. To improve the economic position of the U.S. fishing industry to meet foreign competition.

4. To establish national regional laboratories and provide a stronger, more stable base of support for these laboratories, academic research, and manpower training.

5. To encourage development of ocean resources with a minimum of international conflict, by U.S. initiatives defining a legal regime for the deep ocean floor.

6. To initiate a long-range Federal contract program in basic marine technology, so as to develop a capability to work in the entire marine environment; for example, a Continental Shelf laboratory.

The Vice President also recommended that the Commission proposal to create a separate agency should be evaluated in the context of a broader review of Federal organization, taking into account related environmental and natural resources areas, and maritime transportation.

MR. LENNON. May I interrupt you at this point to ask unanimous consent that there be inserted in the record at this point a letter addressed to the President of the United States, dated March 27, 1969.

I ask unanimous consent to introduce at this point a letter directed to the President of the United States, dated March 27, 1969, by our Vice President, and I will only read the first paragraph:

On February 17, you requested the National Council on Marine Resources and Engineering Development to review recommendations of the Commission on Marine Science, Engineering and Resources set forth in their report "Our Nation and the Sea," in consultation with Messrs. DuBridge, Burns, Mayo and Ellsworth. I am pleased to transmit the following comments:

(The letter follows:)

OFFICE OF THE VICE PRESIDENT,
Washington, March 27, 1969.

THE PRESIDENT,
The White House,
Washington, D.C.

MY DEAR MR. PRESIDENT: On February 17, you requested the National Council on Marine Resources and Engineering Development to review recommendations of the Commission on Marine Science, Engineering and Resources set forth in their report *Our Nation and the Sea*, in consultation with Messrs. DuBridge, Burns, Mayo and Ellsworth. I am pleased to transmit the following comments.

REPORT STRENGTHS AND WEAKNESSES

The Commission's Report is a timely evaluation of the significance of the oceans, domestically and internationally, in relation to economic growth, to improved quality of the environment, and to international understanding. It

was prepared by a group of fifteen distinguished Americans from industry, academia, and Government, only four of whom are directly identified with oceanography. The Report considers emerging legal, economic, and political issues related to the use of our coastlines and the deep ocean, outlines the role of ocean science and technology and environmental services of Federal agencies, and sets forth proposals to strengthen these efforts.

The Report does not treat the Navy's role in national security, nor the role of our merchant marine; it does not develop detailed economic justification for program recommendations, nor select priorities.

Nevertheless, the Report identifies numerous opportunities to develop a more effective and concerted national—not just Federal—effort in ocean and atmospheric activities.

PROGRAM PROPOSALS

The Commission recommends strengthening some ongoing and introducing new ocean and atmospheric programs, particularly:

To foster wise and productive use of coastal resources by (a) establishing a Federal grant program to encourage creation of State authorities for coastal area planning and management, (b) establishing coastal zone laboratories, and (c) planning regional port development.

To expand ocean exploration of coastal and deep sea resources and weather forecasting services to serve a wide range of public and private interests.

To improve the economic position of the U.S. fishing industry to meet foreign competition.

To establish national regional laboratories and provide a stronger, more stable base of support for these laboratories, academic research and manpower training.

To encourage development of ocean resources with a minimum of international conflict, by U.S. initiatives defining a legal regime for the deep ocean floor.

To initiate a long-range Federal contract program in basic marine technology, so as to develop a capability to work in the entire marine environment; e.g., a continental shelf laboratory.

Comment.—Agencies generally supported the goals of these proposed programs; some activity in support of these goals is already underway building on a Government-wide science base in civilian marine and atmospheric affairs of \$350 million per year. The proposals are, however, technically, organizationally, and politically complex, and the agencies had mixed reactions as to details of further implementation. Most would require additional funding.

Recommendation #1. I recommend that (1) agencies consider the potential of the marine environment and take the Commission's program recommendations into account when developing their FY 1971 and future programs and priorities; and (2) the Marine Sciences Council continue to review recommendations, formulate multiagency programs where needed, follow up on agency actions, and advise and assist you in setting priorities, resolving policy issues and assuring that agency activities are effectively coordinated.

ORGANIZATIONAL PROPOSALS

To meet needs and opportunities in marine and atmospheric affairs it foresees during the next decade the Commission urges a major reorganization to combine several new functions with programs that are now part of the missions of five Departments and agencies, to form a new, independent, civilian agency. Specifically, ESSA, Coast Guard, Bureau of Commercial Fisheries, the Lake Survey of the Corps of Engineers and the Sea Grant Program of National Science Foundation would become the nucleus of the organization.

The five agencies most directly concerned oppose loss of functions within their jurisdiction, and commented as follows:

Interior.—Some consolidation is needed to improve Federal marine science programs; but instead of a new agency, functions could be transferred to Interior with broader inter-agency coordinating authority.

Commerce.—Consolidation is needed, but lodged with an existing Department; Commerce could provide the institutional envelope, except for functions of the Coast Guard.

Transportation.—Some consolidation along Commission lines is needed, and Transportation is prepared to provide the necessary leadership.

Defense.—Consolidation of civilian activities, excluding Coast Guard, would offer some advantages, but should not be lodged in any existing Department.

NSF.—Additional study of alternatives is needed before decisions can be made on new organization.

Comment.—Hearings on the Commission's findings are scheduled by the House Merchant Marine and Fisheries Committee to begin mid-April, and Administration witnesses will be called upon for views. Interest by the public and ocean-related industries is growing, but no single organizational proposal is likely to attract immediate Congressional support.

Of the six program areas the Commission felt deserving more emphasis and funding, all but the civilian marine technology could be undertaken in various agencies now involved without reorganization but with continued policy and program coordination. Because of limitations in the Commission Report, changes in Federal organization for carrying out ocean-related and atmospheric functions can be fully assessed only after a further evaluation of (a) the merits of program proposals and of marine-related options to meet national goals, and (b) overall Governmental organization for program needs of the entire physical environment, and Federal support of science and technology.

Recommendation #2.—The reorganization proposal of the Commission (to create a separate agency) should be considered in the content of a broader review of Federal organization—at least a review which takes into account: related environmental and natural resource areas, maritime transportation.

Meanwhile, the Executive Office staffs should continue to review the potential of ocean and atmospheric affairs in relation to national goals, and ways by which existing marine science programs might be organized to improve effectiveness of our Federal effort.

Respectfully yours,

SPIRO T. AGNEW.

Mr. LENNON. I ask unanimous consent also, following the letter of Vice President Agnew of March 27 to the President, that there also be inserted in the record immediately following that letter, a memorandum dated May 29, 1969, to the council members and observers, signed by Dr. Edward Wenk, Jr.

Is there any objection?

Hearing none, it is so ordered.

(The memorandum follows:)

EXECUTIVE OFFICE OF THE PRESIDENT,
NATIONAL COUNCIL ON MARINE RESOURCES
AND ENGINEERING DEVELOPMENT,
Washington, May 29, 1969.

MEMORANDUM TO COUNCIL MEMBERS AND OBSERVERS

In accordance with the Vice President's comments at the May 23 meeting of the National Council on Marine Resources and Engineering Development, I am enclosing copies of (a) the Vice President's March 27 recommendations concerning the report of the Commission on Marine Science, Engineering and Resources, (b) the President's May 19 reply to the Vice President requesting the Council to continue to review the recommendations of the Commission and asking Dr. DuBridge to consider the recommendations in relation to other scientific and technological activities, and (c) the President's May 19 request to Mr. Ash requesting that his study of Federal organization requirements include consideration of the Commission's recommendation to establish a new independent agency drawing together agencies and programs from five existing departments and agencies.

Hearings involving Administration officials before the House Merchant Marine and Fisheries Committee on the Commission Report are tentatively scheduled for June. The memoranda from the President set forth future responsibilities regarding the Report and provide guidance in responding to requests from the

Committee. This guidance does not replace the need for regular legislative clearance as set forth in Bureau of the Budget Circular A-19. The Council Secretariat is available for any further discussion as mentioned in my letter of May 14.

EDWARD WENK, JR.

Mr. LENNON. Now, will you proceed, sir.

Dr. WENK. Thank you, Mr. Chairman. That letter, of course, sets forth explicitly the recommendations by the Vice President.

Mr. LENNON. Yes. My purpose was to get in there the date of February 17, the date that the President requested the Vice President and the members of the National Council to review the recommendations of the Commission.

Thank you, sir.

Dr. WENK. Subsequently, the President issued two directives on May 19. The first was to Vice President Agnew, requesting the National Council on Marine Resources and Engineering Development to continue to review the Commission's recommendations and to encourage further improvement in the coordination of Federal activities.

STUDY BY THE ASH COUNCIL

He also agreed that agencies be requested to take the Commission's recommendations into account in considering their programs and priorities in fiscal year 1971 and beyond and so directed them. He further stated that he had asked his newly established Advisory Council on Executive Organization to place the commissioned organizational proposal—"high on its agenda of matters to be studied." On the same day he wrote to Mr. Roy Ash, chairman of his Advisory Council on Executive Organization, asking him to conduct that study.

Mr. LENNON. May I interrupt you at this point?

I ask unanimous consent to have inserted in the record at this point a letter or a memorandum from the White House, dated May 19, 1969, signed by the Honorable Richard M. Nixon, entitled "Memorandum for Mr. Ash."

Is there any objection, gentlemen?

Hearing none, it is so ordered.

(The memorandum follows:)

THE WHITE HOUSE,
Washington, May 19, 1969.

MEMORANDUM FOR MR. ASH

The Commission on Marine Science, Engineering, and Resources has recently completed a comprehensive review of our Nation's stake in the oceans, which are set forth in the report, *Our Nation and the Sea*. I have asked the National Council on Marine Resources and Engineering Development to review the Commission's recommendations for marine science programs, together with my Science Adviser, and to encourage further improvements in Federal activities.

One of the principal recommendations was the creation of a new independent agency drawing together agencies and programs from five existing departments and agencies. This proposal needs to be examined carefully in the context of broader Federal organizational requirements. Your review should particularly consider related environmental and natural resource problems. Within this context, the Commission's proposals should be compared with alternative ways of coordination and advancing national development of the marine sciences.

RICHARD M. NIXON.

Mr. LENNON. I likewise request immediately following that memorandum there be inserted in the record a letter dated September 11 from the Offices of the Executive Office of the President, which is addressed to me, which is as follows:

DEAR CONGRESSMAN LENNON: Mr. Thomas Clingan, Counsel of your Subcommittee, called today to ask when this Council might examine the subject of oceanography and make its report to the President.

Operating with a small staff, we are approaching the complex matter of Executive Branch organization in stages. We have read the report on the President's Commission on Marine Science, Engineering, and Resources and, at the President's direction, plan to examine the organizational issues that oceanography may pose within the context of broader requirements. We hope to launch the study within the next month or two. After we get into the problem, we will be in a better position to estimate how long it may take.

That is dated September 11; today is September 16, and the directive to Mr. Ash by President Nixon was dated May 19. That lacks 2 days of being 4 months.

(The letter follows:)

EXECUTIVE OFFICE OF THE PRESIDENT,
PRESIDENT'S ADVISORY COUNCIL ON EXECUTIVE ORGANIZATION,
Washington, D.C., September 11, 1969.

Congressman ALTON A. LENNON,
Chairman, Subcommittee on Oceanography,
House of Representatives, Washington, D.C.

DEAR CONGRESSMAN LENNON: Mr. Thomas Clingan, Counsel of your Subcommittee, called today to ask when this Council might examine the subject of oceanography and make its report to the President.

Operating with a small staff, we are approaching the complex matter of Executive Branch organization in stages. We have read the report of the President's Commission on Marine Science, Engineering, and Resources and, at the President's direction, plan to examine the organizational issues that oceanography may pose within the context of broader requirements. We hope to launch the study within the next month or two. After we get into the problem, we will be in a better position to estimate how long it may take.

Sincerely,

MURRAY COMAROW,
Executive Director.

Mr. LENNON. I call the committee's attention to the context of the memorandum of Mr. Ash in which they are asked to make a study and to make their recommendations, and call to the attention of the committee that 4 months later they have not gotten ready yet to start to begin to commence to make the study. Close quote. Now you may proceed.

Dr. WENK. Thank you, Mr. Chairman.

Mr. LENNON. Thank you.

Dr. WENK. To carry out the Council's responsibilities, the Vice President took steps to augment the Council's policy advisory mechanism by establishing a Committee on Policy Review—staffed by officials from the member agencies of the Council at the Assistant Secretary level, and chaired by the Council's Executive Secretary.

This Committee then established four task groups to consider Commission recommendations that could be implemented today if merited, without the need for reorganization. These task groups concern:

1. Coastal Zone Authorities.

2. Marine Laboratories (including Coastal Zone and University/National Laboratories).

3. National technology programs.
4. Man-in-the-Sea.

COASTAL ZONE STUDIES

Parenthetically, I believe a study of the Coastal Zone is urgent, because of the increasing public and private demands for more and more uses of a scarce band of land and water, at the same time it is being degraded by pollution or natural processes of erosion.

This is a key issue. It affects 45 percent of our population in 30 of our States and will influence the legacy of the seashore we leave to our children when, in their generation, 80 percent will reside along our coasts.

Others of the Commission's recommendations are already being implemented or under study. For example, the Commission endorsed the International Decade of Ocean Exploration and interagency staff are now identifying possible areas for increased international collaboration as a part of the U.N. endorsed expanded program of ocean exploration.

The Commission recommendations are complex and in many cases controversial. They deserve careful study. The new administration is engaged in its review of the recommendations. The President has indicated his intention to assure full consideration of the opportunities of the oceans and to assess the Commission's proposals carefully in the context of national needs and priorities.

Mr. LENNON. Just for the record at this point, you state on the third line from the bottom of page 11, "This committee then established four task force groups to consider Commission recommendations that could be implemented today if merited, without the need for reorganization. These task groups concern:

"1. Coastal Zone Authorities."

Now, Dr. Wenk, when was the task force established to consider the recommendations concerning the establishment of Coastal Zone Authorities?

Dr. WENK. Mr. Chairman, I don't believe I can give you anything but an approximate date, but I will supply the exact date for the record.

The approximate date would have been about June 20. (Confirmed as June 24.)

Mr. LENNON. About June 20? The reason I ask that question is because there are expected to be convened here in Washington October 28 and 29 representatives from those States that have shown an interest and concern in the question of the Coastal Zone Authorities and establishment of regional laboratories.

This is an innovation and something new on the part of the committee. It has invited through the respective Governors of all the States their participation in this conference, or forum, or symposium,

and we have asked the Governors to name at least two from these States, people who are members of the Marine Science Council or other suitable organization within the State, to send to Washington for this conference two representatives from what almost every State has, which is a board of conservation and development related specifically to areas in which we are concerned.

It would be most helpful if this panel, which has started its study in this particular field, could participate in this forum or discussion, which will last 2 days.

Identify, please, by their names and their backgrounds, the panel that have been named and which started its study back on June 20 in the area of the Coastal Zone authorities.

Dr. WENK. I would be glad to furnish for the record the list of members from the agencies.

The chairman is Under Secretary of Interior Russell Train, and I am also pleased to report to you, Mr. Chairman, that when we appointed these task groups we gave everyone of them a deadline for their reports, and the deadline for the report from this particular committee is October 1, only a few days from now.

Mr. LENNON. That is good timing.

Dr. WENK. It is excellent timing, Mr. Chairman.

COUNCIL TASK FORCES

Mr. LENNON. Now let me ask you about your task force as related to the Marine Laboratories, including Coastal Zone and university or national laboratories.

Is this the same task force?

Dr. WENK. This is a separate one, Mr. Chairman. This one is chaired by Dr. Al Berman, who is the Director of the Naval Research Laboratory.

Mr. LENNON. Their timetable for the completion of their study is the same as the other, October 1?

Dr. WENK. Yes, sir.

Mr. LENNON. Dr. Wenk, would you furnish at this particular point in the record the identification of the members of those two task forces?

We may want to confer with them in connection with the arranging of this symposium here October 28 and 29.

Dr. WENK. I would be very pleased to.

Mr. LENNON. Thank you very much.

(Information to be supplied follows:)

COASTAL ZONE TASK FORCE

CHAIRMAN, THE HONORABLE RUSSELL E. TRAIN,

UNDER SECRETARY, DEPARTMENT OF THE INTERIOR

Dr. David A. Adams,
Marine Sciences Council

Dr. William Aron,
Deputy Head,
Office of Oceanography & Limnology,
Smithsonian Institution

Mr. Bernard Berger,
Office of Science and Technology

Mr. Burdick Brittin,
Deputy Special Assistant for Fisheries
and Wildlife to the Secretary,
Department of State

Major General Robert H. Curtin, USAF,
Director of Facilities,
NASA

Cdr. Clarence R. Hallberg,
U.S. Coast Guard

Mr. Erwin Hannum,
Water Resources Coordinator,
Department of Commerce

Mr. Reuben Johnson,
Deputy Director,
Water Resources Council

General F. P. Koisch,
Director of Civil Works,
Office of the Chief of Engineers,
Department of the Army

Mr. Samuel Kramer,
Bureau of the Budget

Mr. James A. Lee,
Director of Health Ecology,
Department of HEW

Mr. Charles Maechling, Jr.,
Deputy General Counsel
National Science Foundation

Mr. Paul Manchester,
Council of Economic Advisers

Mr. James McBroom,
Bureau of Sport Fisheries & Wildlife,
Department of the Interior

Dr. Charles L. Osterberg,
Division of Biology and Medicine,
Atomic Energy Commission

MARINE LABS TASK FORCE

Chairman, Dr. Alan Berman,

Director of Research, Naval Research Laboratory

Dr. James Coleman,
Division of Research,
Atomic Energy Commission

Maj Gen Robert Curtin, USAF (Ret),
Director of Facilities,
NASA

Captain John E. Day
Department of State (Sci)

Mr. Harold L. Goodwin,
Office of Sea Grant Programs,
National Science Foundation

Dr. Merton C. Ingham,
Director of Oceanography,
U.S. Coast Guard

Mr. Arnold Joseph,
Marine Sciences Council

Captain J. E. Langille, U.S.N.,
Deputy Director of Navy Laboratories,
Department of the Navy

Mr. Mortin Rubin,
Deputy Chief,
Plans and Requirements Division,
Environmental Science Services
Administration

Mr. Glenn Schleede,
Bureau of the Budget

Dr. Roland F. Smith,
Assistant Director,
Office of Marine Resources,
Bureau of Commercial Fisheries,
Department of the Interior

Dr. John Steinhart,
Office of Science and Technology

Dr. Eugene I. Wallen,
Head, Office of Oceanography &
Limnology,
Smithsonian Institution

Mr. John L. S. Hickey,
Office of Assistant Administrator for
R. & D.,
Consumer Protection and Environ-
mental Health Service,
Department of HEW

ORGANIZING FOR MARINE AFFAIRS

Dr. WENK. One major recommendation of the Commission is to establish an independent National Oceanic and Atmospheric Agency organized around a unity of the sea, coastal zone, and atmosphere. This recommendation arose from an issue that conspicuously presents itself simply from the number of different Federal agencies having statutory missions in the sea.

Since 1807, these functions grew independently in response to isolated needs—to foster safe navigation, maintain naval defenses, collect customs, and in recent years, to aid the domestic fishing industry, control pollution, create harbors, protect the shoreline. In all cases, the common denominator was the sea.

A coordinating committee on oceanography was organized informally in the 1950's so that the scientists in separate Federal agencies could exchange data about the environment, because such information collected for one purpose found multiple applications to other missions.

Mr. LENNON. Right at that point, Dr. Wenk, for identification we are talking about the so-called interagency committee, are we not, on oceanography?

Dr. WENK. Mr. Chairman, at this stage I am referring to an earlier time.

Mr. LENNON. Earlier than the so-called ad hoc interagency committee by about 4 years, wasn't it?

Dr. WENK. This ran about 4 years before the interagency committee was established. The interagency committee on oceanography, ICO, was established in May 1959, and it was a committee of the Federal Council for Science and Technology, which itself was established by Executive order, I believe, in March of 1959.

But prior to that time there was this purely ad hoc committee.

Mr. LENNON. Thank you for that explanation. I wanted that in the record at this time.

Dr. WENK. Now, a variety of formal mechanisms were subsequently proposed to coordinate programs and prevent duplication as the funding for oceanographic research grew. The Federal Council for Science and Technology, as you noted, Mr. Chairman, was created by Executive order, and its interagency committee on oceanography to deal with this problem, so that statutory proposals by the Congress were considered unnecessary by the executive branch.

However, this arrangement was considered inadequate by the Congress. In 1966, a Vice Presidentially chaired Cabinet-level Council was created to advise and assist the President, focused on policy and program planning to use as well as study the seas. This is the present arrangement.

Mr. LENNON. I won't take time at this point in the record to discuss the traumatic effect that we have had in our relationship with the executive branch of the Government in trying to convince the executive branch of the Government that neither the so-called Coordinating Committee on Oceanography nor the subsequent Interagency Committee on Oceanography reached the level that its policies were followed; it did not reach a policymaking level.

I am constrained to mention the fact that in the consideration of Public Law 89-454, you remember the exchange of colloquy and con-

versation and persuasion that we had to use to try to convince the executive branch that in our judgment at least the establishment of the national council was essential, and it took a lot of doing. You remember that. You participated in it.

Dr. WENK. I do, Mr. Chairman, and if I may say, you were most persuasive.

Mr. LENNON. I think you would have to admit that what glamor has come to the marine scientist, that is, in national and international image, has come out of two things: establishment of this national council and what it has done, and the creation and subsequent appointment by the President of this commission and this report.

Just assume now that we had said, yes, we will go along with the executive branch of the Government and not include in Public Law 89-454 the establishment of the national council. Where do you think we would be today?

Dr. WENK. Well, I must say, Mr. Chairman, I do not believe that we would have been as far along if we had not had the council.

Mr. LENNON. You see, you must admit that sometimes Members of the Congress react generally to the thinking of the people of this country as well as the executive branch of this country. I am just thinking as you sit here this morning, giving me your views, which I have read on through the balance of your statement, we have to make a decision, or if we don't, follow what the administration has suggested. Now, if we followed only what the administration not only suggested but insisted on, we would not be where we are today.

I think you would have to agree with that. Maybe not for the record, but go ahead.

Dr. WENK. Even for the record, Mr. Chairman, I would agree.

Mr. LENNON. Go right ahead.

Dr. WENK. Well, the case you made in 1966 was most persuasive and, as you know, the consequence was the enactment of Public Law 89-454.

COUNCIL ACTIVITIES

In order that you may have a better basis for your evaluation of the commission's organizational recommendations. I would like to bring you up-to-date on some of the council's recent activities.

Specifically, the council has considered such policy issues as:

1. Steps to encourage the States and regions to carry out more effective programs of planned use of our coastal zone, to take into account the more intensive, varied uses of a limited shoreline.

2. New measures to reduce pollution and insure safety of life and property as maritime activities and congestion increase along our coasts and on the high seas.

3. Strengthening the harvesting sector of the domestic seafood industry, which in many areas cannot successfully compete with foreign fishing fleets.

4. Advancing the development of fish protein concentrate technology as an integral part of the food-from-the-sea program to help meet worldwide malnutrition.

5. Preparing for development and redevelopment of our ports and harbors, which are too often characterized by obsolescent facilities and waterfront slums.

6. Strengthen the planning base for decisions on the International Decade of Ocean Exploration, which could provide a broader and more effective framework for cost-sharing with other nations.

7. Developing a legal regime for the deep ocean floor which will encourage private investment and development of seabed resources, reduce the possibility of international conflicts and disputes, and promote U.S. security, economic, political and scientific interests.

8. Intensifying deep ocean technology research and development to enable the Navy to respond to increasing demands for operations in deep water.

9. Emphasizing sea-grant investments for applied research and training specialized manpower, particularly ocean engineers and technicians that will be needed for technological development of marine resources in the 1970's.

10. Improving capabilities for processing of marine science information, which is critical for successful research and development activities.

PRESIDENT'S ANNUAL REPORT

Although not explicitly provided for in the act, the President has assigned responsibility for preparation of his annual report to the council. After drafting by the council staff, the report is reviewed by council members and observers, and unsolved issues, unclear jurisdictions and controversial programs are clarified and resolved. It is then transmitted to the President.

All three of the reports so far prepared by the council have been transmitted by the President to the Congress. By its scope and content, the report assists executive agencies, at various echelons, to focus on common goals. It is also intended to aid Congress in relating program elements presented to the many appropriation and legislative subcommittees; industry, academia, State and local governments and foreign nations concerned with relating their goals and programs to our national effort.

COMMUNICATION WITH CONGRESS

Since its establishment in June 1966, I have appeared before congressional committees 18 times to testify on legislation, to review our activities, and to speak on behalf of other agencies' programs and funding requests. We are often asked to comment in writing on pending legislation, and at present are responding to such requests, discussing 28 bills and resolutions.

COMMUNICATION WITH THE PRIVATE SECTOR

The Council has released general background information concerning the content of some 2,600 projects sponsored by the Government, oceanographic ship operating schedules, university curricula in oceanography, potential of spacecraft oceanography, and marine science activities of some 100 countries.

It has sponsored over 20 contract studies on legal and economic as well as technical questions. It has continually worked to bring the views of State and local governments, universities and industries more directly into the mainstream of national policy planning,

through consultation with non-Federal organizations and individual experts, joint sponsorship of a seafood industry conference, conduct of a conference of 80 non-Federal research laboratories, seminars on Government-industry cooperation, and a forum on Federal-State cooperation dealing with coastal planning.

Does the Council work?

Perhaps the first test is whether it is used by the President as a staff advisory arm for marine affairs in the role cast for it by the legislation:

To survey policies, plans and programs of participating Federal agencies.

To develop a comprehensive program of marine science activities conducted by Federal agencies in cooperation with non-Federal.

To designate and fix responsibility of participating agencies, insure cooperation and resolve differences.

To undertake studies of legal problems related to marine resources.

To establish long-range studies as to potential benefits.

To consult with and solicit views of Federal agencies and non-Federal interests.

To coordinate programs of international cooperation.

To provide policy guidance to the national sea grant program.

I believe the annual reports prepared by the Council for the President and the abstract of Council activities cited previously answer the questions affirmatively.

Mr. LENNON. I would interrupt to call your attention to the question you ask the committee and the marine science world: Does the Council work? And then you go on to definitively show that it does work, and what it has accomplished.

And yet we would not have had a Council and the many things that you have enumerated that the Council is responsible for; were it not for the action of the Congress. You are the person to best know what the Council has done.

I have said this many times privately and publicly, and continue to say it. Now you say it. You will have to admit that it wasn't through any initiative—in fact, it was over the opposition of the executive branch of the Government that you did these things that you set forth in such detail that the Council accomplished as a result of the Council being created.

Now, go ahead.

Dr. WENK. I must agree, Mr. Chairman, and legislative history confirms your comment, the executive branch did oppose Public Law 89-454 until it was enacted by the Congress. But once it was signed by the President, and I think the important thing at that point in history is—

Mr. LENNON. The finest thing that ever happened.

Dr. WENK. That is right. The Chief Executive should perhaps be permitted to change his mind. Although there had been initial opposition, immediately after the signing there was complete support for this act.

Mr. LENNON. With that I agree.

Dr. WENK. And the progress we have made since that time is recited in these few pages in this testimony, I believe the Congress as well as those in the executive branch may share some satisfaction in seeing,

first, the wisdom of the act itself, and secondly, some of the progress that has been made during this time.

I should add that, from my point of view as executive secretary of the Council, there are difficulties with the temporary nature of the Council arrangement. I am referring to the difficulties that I have had in attracting and holding good professional people for the Council staff.

The life of the Council has already had three expiration dates and this uncertainty has contributed to the problem. Therefore, I am happy that the Commission's organizational recommendations are under active consideration and that presumably this will lead to decisions on future arrangements, including a decision with respect to continuation of the Council.

THE COUNCIL IS NOT AN NOAA ALTERNATIVE

May I next point out that while the present multiagency arrangement and the Council are collectively an alternative to NOAA, the Council itself is not. A policy and program planning and coordinating body is like a steering mechanism on a rocket that directs the thrust of separate boosters, but it can add only limited thrust itself. The Council is not an operating agency.

On the other hand, the National Oceanic and Atmospheric Agency is conceived as a funding and operating agency. It was recommended by the Commission specifically to meet their goals and carry out the programs that are now part of the missions of several departments and agencies, expecting to gain greater efficiency through improved performance in the consolidation of ships, laboratories and personnel.

NOAA would comprise not only a number of ongoing functions, but would be the host for some new functions proposed by the Commission, such as rapid expansion of civilian ocean technology. Most significant of all, the Commission saw the NOAA as making its way in the Government structure with an improved management capability to obtain funding for marine science programs.

ANALYSIS OF NOAA

In my view, that consolidation would have a better chance than the present arrangement to meet the goals set forth by the Commission, goals which incidentally correspond to those of Public Law 89-454 under which the Council has operated.

Mr. LENNON. Right at that point, Dr. Wenk, you say:

In my view that consolidation would have a better chance than the present arrangement—

Meaning the arrangement we have now, if we have one—

to meet the goals set forth by the Commission, goals which, incidentally, correspond to those of Public Law 89-454 under which the Council has operated.

Now, as you go on, we are coming back and trying to get you to definitely state how you differ, if you differ, with the Commission's goals as set forth in this report and as provided in the mandate of the Congress to the Commission that if they did recommend the Government structure, what type of Government structure should it be.

Will you talk about that as you go on?

Dr. WENK. All right, sir. If I could just give a brief response, though, to that point, I think the question before us, somewhat oversimplified, could be phrased this way: If we had a chance to start over, would we organize the Government the way we are organized today to do the job set forth in Public Law 89-454? And my answer to that is, No; if we had a chance to start over, I would not advise organizing the way we are today.

Mr. LENNON. Not having that chance, what should we do?

Go ahead.

Dr. WENK. Thank you. Let me add, Mr. Chairman, that we should not be enchanted by reorganization as a panacea. Unless more funds are made available, the Commission's objectives will not be achieved. In today's budgetary climate, there is absolutely no expectation that the very large increases visualized by the Commission can be realized, and thus reorganization cannot possibly have the result they sought in the short run.

Mr. DOWNING. You say, unless more funds are made available. Exactly what are you talking about? What are you operating under now?

Dr. WENK. Well, I am referring, Mr. Downing, to the goals which the Commission set forth in their report, which they believe could be accomplished, as I understand it, with reorganization on the one hand, in the sense of a better piece of machinery, but with some gas in the tank. The money that is necessary to accomplish their goals, at their timetable, as you suggest here, is not in the cards in the near future.

Mr. DOWNING. All right. Thank you.

Mr. DELLENBACK. Just what is the difference in the amount of gas you have got to have?

Dr. WENK. The Commission was quite specific in this regard in their report on page 256 and a few earlier pages. They note within their scope of definition of marine activities, not including the military, that there is being spent today approximately \$900 million each year, a very substantial fraction of which, incidentally, is in the Coast Guard.

Mr. DELLENBACK. That is being appropriated?

Dr. WENK. Appropriated each year, roughly.

They propose approximately doubling this in a 10-year period. But they emphasize that the growth in the program should begin immediately and, in fact, if I may quote, they say they would propose "a more rapid growth early in the coming decade and a leveling off of expenditures in later years," and I think what I am saying is that that philosophy of theirs is unlikely in today's budgetary climate.

I guess what I was saying was that, given the agreement on the merits of the goals, and even given an agreement on the merits of reorganization in the long run to achieve these goals, in the short run the funding they propose, increases—incidentally, of perhaps \$400 million a year—are unlikely in the next year or two.

Mr. MOSHER. Mr. Chairman?

Mr. LENNON. Off the record.

(Discussion off the record.)

Mr. LENNON. Back on the record.

Dr. WENK. Mr. Chairman, why don't I concentrate most of my review here on this question of NOAA, and with your permission,

then, simply submit the rest of the written statement for the record, and then be available to answer questions.

Mr. MOSHER. Mr. Chairman, some of you have read the statement in advance, but I have not. I would like to hear the statement.

Mr. LENNON. Go ahead. Will you finish your statement?

Dr. WENK. All right, sir.

However, we must not be enchanted by reorganization as a panacea. Unless more funds are made available, the Commission's objectives will not be achieved. In today's budgetary climate, there is absolutely no expectation that large increases visualized by the Commission can be realized, and thus reorganization cannot possibly have the result they sought in the short run.

Furthermore, the Commission proposal would establish yet another agency reporting to the President. Some students of government feel we already have too many.

Although a NOAA consolidation, in my view, clearly improves a Presidential leadership in the specific area of the oceans, atmosphere and coastal zone, it is not without serious side effects in nonoceanic missions. Departments of Transportation, Interior, and Commerce would lose agencies and functions related to their present missions, and these separations must be evaluated—especially regarding the Coast Guard, because it is such a large component of a still young Department of Transportation.

The Commission, incidentally, recognized that many other permutations were possible, and anticipated that NOAA could be transferred into a new Cabinet-level department with a more comprehensive program at a later date.

But the Commission believed that until unity is provided for the oceanic and atmospheric components on their own, attempts for a larger amalgamation would be premature and possibly harmful.

One alternative to NOAA is to consolidate the same functions in an existing department. Considering their goal of a separate identity for oceanic/atmospheric activities that already face a severe competition for attention as elements in departments with broader missions, the Commission did not see this alternative as successful.

Another proposal would take the Commission's National Oceanic and Atmospheric Agency and add the Maritime Administration. Such a proposal would in effect provide for a stronger Federal agency dealing with the oceans, but continue problems of relating ocean activities with other activities; for example, in matching maritime with air and land modes of transportation.

Such an approach would be desirable only if the President and the Congress decide that the marine and maritime presence of the United States is so important and of high priority as to warrant an agency with that objective reporting to the President.

Yet another alternative is to create a Department of Natural Resources and the Environment, with a strong marine component.

CRITERIA FOR EVALUATION OF NOAA

In reviewing the Commission's proposal, I should like to propose some criteria for evaluation of alternative organizations:

First, is it better to organize around activities involving the oceans

rather than around functions, or objectives such as transportation, food production, and use of natural resources and environment?

Second, are there ways short of NOAA to improve the effectiveness of our oceanographic effort to meet national goals?

Does the new organization have a clear mission to serve a major unmet public need?

Does it contribute to improved decisionmaking of Government programs and foster the resources necessary to carry them out?

Is the reorganization stable or vulnerable to possible changes in a short time due to change in function, or evolution of technology?

Does it provide for better performance at the same or lower cost?

Does the proposal provide for coherent management, quality performance and attraction of good personnel?

Do the unwanted consequences of reorganization outweigh possible gains?

Does the organization help the President and the Congress do their job better?

Tested against these criteria, no alternative is without some advantages and disadvantages. This is what makes the present careful analysis absolutely necessary. To reorganize hastily could be counterproductive.

BARRIERS TO USE OF THE OCEANS

The Commission was well aware that reorganization is not the only remedy to impediments in using the oceans; many simply depend on more funds. But they also identified numerous legal and institutional factors established for good and sound reasons at one time, but now deserving reevaluation because they have become barriers.

State and local laws, for example, have inhibited marine expansion in fisheries. In addition, practices with respect to land development and water use in the coastal zone are also affected by archaic laws, multiple jurisdiction and often the lack of any effective zoning controls.

One result of your hearings, I predict, Mr. Chairman, will be greater interest by the States and local communities in seeking more rational use of the coastal resources.

COST OF COMMISSION PROPOSALS

I would like to point out that the Commission's recommendations could be quite costly. Obviously, if the Commission proposals were accepted, this program could start out more modestly and rise more gradually over a 10-year period than they propose. It is important to point out that the current fiscal situation certainly limits any commitment of additional funds for this fiscal year at levels they propose.

However we should endeavor to extract the maximum effect from present activities, being selective in priorities, improving productivity and decreasing waste.

ACTION OUTSIDE THE EXECUTIVE BRANCH

By holding these hearings, the Congress is participating in the establishment of priorities. The Congress, and particularly this committee in the House, should recognize its important role in helping focus attention on our marine program.

The Congress is a mirror of consensus and if the public is convinced that the national marine effort is important, it will be reflected in your hearings. I want to assure you, Mr. Chairman, that we in the executive branch are very carefully studying the testimony being offered on the Commission report.

A national program refers also to the inclusion of activities outside the Government as well as those within it. Many of the public witnesses who have appeared before this subcommittee to discuss the report have stressed the importance of ensuring that the States, local communities, small business, industry and the universities have a role in the formulation and implementation of our activities in the sea.

The Commission proposed a National Advisory Committee on the Oceans to bring these outside interests together. This, too, will be studied by the President's Advisory Council on Executive Organization.

Whether consultation with the non-Federal sector takes this or some other form, continued consultation with these groups is absolutely essential.

NATIONAL PRIORITIES

Where do we go from here? I would like to close by saying that the oceans and coastal zone are only important as they meet the priority needs of the Nation. The Commission wisely recognized that its recommendations were to serve public purposes.

As we deliberate their recommendations, we will want to insure that priorities are directed to the quality of life, the security of our people, and resources to meet our needs.

If the oceans and coastal zone are deemed of priority importance to the Nation, within a national set of priorities, we must take the necessary steps to get on with the job.

Lastly, I want to point out that decisions on these proposals affect not just today's concerns but the years to come. We have to recognize science and technology as a long-term investment. We look to the decade of the seventies and even beyond.

Therefore, it is important that the Congress and the executive branch keep in mind those proposals that must be deferred now because of inflation and the consequent budget squeeze, but which have merit for the long-term investment in marine affairs.

We do not intend to stand still, for the oceans are one of man's great resources. They are probably the last new frontier on earth. We will develop ocean resources and the coastal zone and strengthen our ability to use the sea in both old ways and new.

I once called the oceans "the fifty-first State." I believe all of us are residents of that "State" by proxy. Together we must be sure that our interests are served.

Thank you very much, Mr. Chairman.

MR. LENNON. Mr. Mosher?

TIMING OF ACTION BY THE ADMINISTRATION

Mr. MOSHER. Well, Mr. Chairman, as usual Dr. Wenk is very articulate in saying many of the things that need to be said. I must say that I, as one member of the committee—and I suspect I speak for many members of the committee—wish that he could come in here with a resounding affirmative statement which would propel us much more rapidly toward the goal that we seek in the reorganization that many of us consider to be necessary.

Dr. Wenk, do I sense accurately that there isn't any hope that the present administration will give us precise and decisive advice on this matter of reorganization, an urgent recommendation? There isn't any hope of that in the next few months ahead?

Dr. WENK. Well, Mr. Mosher, I don't believe I can answer that with any precision—as to a forecast on the date at which the administration would have a position on this particular proposal. As your chairman noted, the Advisory Council was assigned this responsibility by the President and has it under review. I believe it is fair to say that it is being considered in the context of broader issues as, for example, the matter of organizing with regard to management of our entire environment, reorganizing with regard to the specific role of science and technology, and these take time.

I really would not like to forecast, but in making no forecast I also don't want to be completely pessimistic about a report or reaction to this proposal.

Mr. MOSHER. Well, we won't get any recommendation concerning NOAA out of the Ash Commission until it is ready with its complete recommendations. Is that what you are suggesting?

Dr. WENK. When the Vice President recommended to the President that the Ash Committee undertake this study, it was in the context of looking at this more broadly, more broadly than the Commission was able to do within its charge, I believe the wisdom of that proposal lies, first, in making sure that in organizing for one objective we do not inadvertently degrade another; secondly, I think those who might be opposed to NOAA might then use the failure to look at this in the broader context as an argument for delay.

Therefore, I think there is really some merit, even from the point of view of support for this agency, in looking at it in a broader context.

POSITION ON THE COMMISSION'S RECOMMENDATIONS

Mr. MOSHER. I am assuming that this prepared statement—and it was an excellent statement that you presented this morning, even though it is somewhat disappointing; it sets some guidelines for us and raises some questions we have to answer—I am assuming this statement is one that represents the thinking of quite a few people, not only yourself, but the Bureau of the Budget, the White House, but I am assuming that it perhaps somewhat waters down your own—"waters down" shouldn't be considered as a pun—but waters down your own thinking.

Now, for instance, on pages 21 and 22, the questions you raised there, and they are questions that this committee has to consider, would your own personal answer to those be largely "yes"? Would your own personal answer to those be largely affirmative?

In other words, are you willing to speak personally, as distinguished from your official position? Are you willing to speak personally on the record?

If not, I do not want to embarrass you—are you willing to give us a more affirmative, a more urgent and more affirmative support for NOAA or something like NOAA, than your own testimony here would indicate?

Dr. WENK. Well, Mr. Mosher, first let me say that the statement pared it as executive secretary of the Marine Council.

Inevitably, each of us becomes influenced by what we discuss with other people, so this may have reflected the views of others, but it was prepared as the view of the executive secretary.

It was cleared by the Bureau of the Budget, and I will say that their constraint on this testimony was minimal. So, therefore, it does represent my viewpoint.

I feel obliged to respond candidly to any questions you may ask, and in this regard I would not separate these as an Administration view versus your witness' view. I will simply answer any question that you may ask, and I will be as candid as I can.

WITNESS SUPPORT OF NOAA

Mr. MOSHER. Well, your view is largely affirmative toward the proposed NOAA?

Dr. WENK. As I indicated in the testimony, given the premise of the Commission that marine affairs deserves a higher priority in our scale of priorities than exists today, and I personally believe that—

Mr. MOSHER. You agree with that premise?

Dr. WENK. I do, indeed. Given that premise, then I believe, as I said in the testimony, I strongly believe that the proposal by the Commission provides in general terms an organization more suited to meet those goals than the present organization today.

I will not equivocate in that statement.

Mr. MOSHER. Mr. Chairman, I believe that the committee is on the right track in picking up the ball and running with it and not waiting for recommendations from the Ash Commission or the administration. I am glad that you are conducting these hearings. I think we may have to take, as we have done in the past, take some very vigorous initiatives despite hesitancy in the administration.

PRIORITIES FOR MARINE SCIENCE

Dr. Wenk, on page 19 you use a rather strong phrase. You say there is absolutely no expectation that the budget increases contemplated by the Commission, there is absolutely no expectation that those can be realized in the short run and the near future.

It may be that within the executive branch there is absolutely no expectation, but I am inclined to think that within the Congress in thinking of rearranging the priorities, the Congress might decide to cut some place else in order to find these budget increases. I, for one, am not willing to say that it is impossible for us to create NOAA.

simply because there isn't enough money at this time. I think Congress might well find that money.

I turn it back to you, Mr. Chairman.

Dr. WENK. If I may comment, Mr. Mosher. Perhaps "absolutely" is too strong a word. May I speak to two points: first, the point of the written statement was to note that some of the goals portrayed by the Commission can be realized only if there is more gas in the tank regardless of reorganization.

The second point is one in which there may be different ways to interpret the Commission report or to proceed with their implementation. They foresaw a doubling over a period of 10 years, which is not a very fast rate. But they recommended a far sharper increase at the beginning of the decade rather than later on. It is on this point that I feel that we should be realistic and state that these very large increases—and they are fairly substantial—that they propose in their report for the early years—may have to be deferred.

Mr. MOSHER. I recognize the constraints and their validity. But, nevertheless, the national budget is a tremendous budget and I think there are opportunities for us to decide that there is some place we can cut and other places where we can increase, where the national need is real, and I think the national need here is real.

Dr. WENK. I would like to reassure you, Mr. Mosher and the subcommittee, that the executive branch shares your view that the distribution of funds—let's just say within the research and development budget—deserves review and sharp evaluation, even without increases in that total; that total is somewhere close to \$17 billion a year, and it has been about that level for several years.

The current pattern of funding grew on the basis of random priorities that were set one at a time over the past 10 years. There is no reason to believe that they would still fall in that same pattern. It is my belief that the President and the Bureau of the Budget and the President's science adviser feel quite strongly the present distribution of funds deserve evaluation and are taking positive steps to look at this total.

Mr. MOSHER. I wish we in Congress had a more effective way to assess the various priorities. Even without an effective way, I think we have got to do something.

Mr. Chairman, I don't want to monopolize.

Mr. LENNON. Thank you and Mr. Rogers?

FUNDING AS INDICATOR OF PRIORITIES

Mr. ROGERS. Thank you, Mr. Chairman. It is always good to see you, Dr. Wenk, and we appreciate your testimony. I share my colleague's feeling that it is disappointing that it is not a more affirmative picture although I realize the restraints that you have stated. What are the national priorities? Can you give us a list of national priorities?

Dr. WENK. That is a very difficult question, Mr. Rogers.

Mr. ROGERS. Well, can you submit it for the record? I realize you may not have it here. If you get it for us, this might be helpful to make it a part of the record.

Dr. WENK. I believe the budget is a reflection of our priorities. As

someone once said, it is a one-dimensional reflection of a multi-dimensional set of needs and wants of the Nation. It would be difficult to portray these in any defined form. I believe insofar as a response could be made to your question, two points, No. 1—I think the President himself enunciates items which he considers of priority attention. The mere fact that they become Presidential recommendations symbolizes his belief in priorities.

Mr. ROGERS. What I am thinking about is a listing. I realize when the President makes a statement on something, he considers it important. But it is difficult for us in Congress to find out from any Administration—not only this one—what the priorities are, and yet they are always giving us the answer, “Well, they have to take place in the priorities.” Until we get a list of those priorities, it is difficult for us to make the judgment, because we may not agree with the weighting of priorities.

Dr. WENK. Again coming back to the budget as a reflection of priorities—there is one set of facts that I have found interesting, and I would like to share with this committee: Within the total Federal funding for research and development of \$17 billion per year, only 3 percent, goes to marine science affairs. Of the \$17 billion, 36 percent goes to the space program, either civilian or military, 33 percent goes to other military, that is other than their contribution to the space program, 10 percent to atomic energy, 6 percent to health, 12 percent for all others. This would include agricultural research, transportation research and so on.

So that this, I believe, is one way of saying how the priorities were established in the past—

Mr. ROGERS. Well, I am asking for them now in the present. I won't pursue this. If you will submit it for the record, I will stop.

Dr. WENK. I shall certainly endeavor to answer your question. In short, however, I believe that current approval of the importance of the oceans to our Nation would indicate 3 percent is too low.

This administration is reviewing priorities in connection with the development of the Budget which is now underway. The President's priorities will be reflected in the budget he transmits to the Congress in January.

COMMITTEE'S VIEW OF THE ROLE OF THE COUNCIL

Mr. ROGERS. I am concerned we are getting away from what this committee and Congress intended when we set up the Council. It appears to me that the President's science adviser is trying to inject himself too heavily in this field now and trying to downgrade the activity of oceanography. I hope this is not the case and I hope our committee will go into this with the science adviser of the President.

Also, I am concerned by the fact that the Council has not been the salesman for oceanography that I think it should have. I think the Vice President and the Council should have convinced the President, should have convinced the Bureau of the Budget, should have convinced Mel Laird, Secretary of Defense, who cut our submersible fund, that these are essential things for the Nation's development and it's going to bring economic ruin.

You know there is a lot of difference when you are just spending

money and not getting anything back, that's what makes inflation go up. When you are spending money and getting a return that is a different situation. We could bring up our productivity by taping the vast potential of the ocean.

Now, another thing I am concerned with: I think it would appear that we are going backwards. After setting up the Council we are going back to an interagency operation, where you set up in the Council, a committee on policy review which is staffed by officials in member agencies of the Council at the assistant secretary level.

Well now, if we are going back into operation of interagency committees, only, and they are setting the policy and policy review, we might as well abolish the Council and go back to an interagency committee, which is a backward step as far as I am concerned.

It is downgrading. We wanted to have policy set by those people on the Council and not by the assistant secretaries. Furthermore, it seems to me when you are putting an important decision on an organization and chair it by one of the particular departments that has one of its member agencies under its control, but which might be transferred, you are almost asking for sudden death. I wouldn't think that the Council would get very good advice. I don't mean to personalize but just as an example, what response would you expect if an Assistant Secretary of Interior considered whether they ought to transfer some responsibilities to fish and wildlife.

I don't think they will do it. So everyone will say, well, let's let the Ash committee study it, and I agree with my colleague there. They have eight staff people and eight clerical people. They were formed. I understand, in April, they have met 3 times, once in June, once in July, and once in August. I understand they are going to meet Thursday in September.

Well, it seems to me to reorganize the whole executive branch, as my colleague, Mr. Mosher said, we can't wait for that because someone does not understand the priority of development of the resources of the sea.

That is why I think the chairman, and my colleagues here are correct in moving ahead. The Congress is going to have to take the initiative as we have had to do in the past with other administrations. I think we are going to have to do it again, and I think this committee is ready to do it. I hope that you can take back to the Council the concern of Members of Congress that we are not getting the leadership from the Vice President and the Council that we should in oceanography matters.

There has been a downgrading, unfortunately, rather than an upgrading which was the very purpose of establishing the Council.

THE ROLE OF THE CONGRESS IN SETTING PRIORITIES

Now, let me ask you this on the subject of money. I don't know why the Congress should not start looking at programs. For instance, foreign aid where Congress appropriated about \$1.7 billion. I think the request is now up to \$4 to \$7 billion more. I think it is quite possible we may want to review that and say maybe we would rather put a couple of hundred million more, maybe 300 or 400 into this effort, rather than increasing what we did last year in foreign aid.

Just as an example. So I don't think it is beyond possibility that this Congress may well change some priorities. I think we are going to have to, in order to meet what I think are the real needs of this Nation.

ADMINISTRATION'S INTEREST IN MARINE SCIENCES

Dr. WENK. Mr. Rogers, I hear your message, and I will faithfully transmit this back to the Vice President and to the President, because I think this is an important thing you are saying. But I would like, if I may be permitted, Mr. Chairman, to comment on one or two of Mr. Rogers points.

First, I want to reassure this committee that Dr. DuBridge, the President's science adviser, is interested in marine affairs. I have had the most cordial personal relations with Dr. DuBridge since he has been in office, and encouragement to proceed with the programs that we are developing in the Council. From his point of view, obviously Dr. DuBridge has broader responsibility and must look at marine sciences in the context of all the other fields of science. But I really want to assure this committee that this relationship is a very, very healthy one.

Now, on the matter, Mr. Rogers——

Mr. ROGERS. May I just comment there? You know, this was one of our problems before. The President's science adviser was not giving proper attention to this field and that is why we took it out of there and put it in the National Council. Now I haven't seen enough action from the Council, nor have I seen its influence in the executive circles sufficiently showing itself to feel much confidence that you are even convincing the President's science adviser of a priority of oceanography, and what it should be given.

COUNCIL INITIATIVES

Dr. WENK. If I may just comment briefly on these points: No. 1, these letters referred to earlier by Chairman Lennon, particularly the report by the Vice President, reflect the early attention to and interest of this administration in marine sciences. There is action occurring. My calendar is to provide advice and assistance to the President on every major issue I can get through the Council, in terms of recommendations on the six major program areas of the Commission report, plus others that are emanating from our own office this fall, together with recommendations on budgets for fiscal year 1971. The President will have the opportunity of considering options, more options again in this matter of priorities, and I am doing my best to generate the best possible case for marine sciences. The Committee for Policy Review is not a substitute for the Council. Rather, the CPR and its task groups are added insurance of Council receiving recommendations that have been carefully evaluated and thus having a higher probability of adoption. However, the Commission made a point in its report that in the long run, no Presidential staff can be an advocate for any single area, and I believe this is the key point——

COUNCIL AS ADVOCATE

Mr. ROGERS. Now just a minute. This is a Council on Oceanography.

Dr. WENK. But it is still in the Executive Office of the President, Mr. Rogers.

Mr. ROGERS. Do you think the Council that established our space program was not an advocate for the space priority?

Dr. WENK. In the case of the space program—

Mr. ROGERS. If you think it was not, I would suggest you review its history.

Dr. WENK. Well, Mr. Rogers, if I may suggest, I think the reason the space program made the progress it did is more because there was an operating agency in NASA that was able to make the case as an advocate.

Mr. ROGERS. Yes, and that is what we want for oceanography and we are not getting the support that we should from the Council to establish that. I was hopeful the President would move ahead and do it himself, but obviously it is going to be studied, so the Congress has to do it.

Just one more thing, then I will conclude. I am also concerned that the Council doesn't develop into an operating agency. This is not what we established it for. We established it for policy and to give push to oceanography. When I see activities such as sponsorship of seafoods industry conference, conduct of 80 non-Federal research laboratories seminar on Government-industry cooperation, I am not sure but what this may border on agency operation, rather than policy determination and leadership.

Dr. WENK. May I speak to that point, Mr. Rogers, that these conferences were entirely for the purpose of consulting with the non-Federal interests. The marine program is quite different from the space program in that it involves interests and investments by the private sector.

The space program is 98-percent Federal. This marine program is perhaps 50-percent Federal, but it also involves State governments, involves the fishing industry, the petroleum industry, and so on.

Mr. ROGERS. I understand that, but I think this is more of the operation of an agency to establish these relationships rather than the Council.

Dr. WENK. I would be pleased to go into detail, Mr. Rogers. One of the things I took quite seriously in the act, section 4(b) states, "In the planning and conduct of a coordinated Federal program the President and the Council shall * * * consult with departments and agencies concerned with marine science activities and solicit the views of non-Federal organizations and individuals with capabilities in marine sciences."

Mr. ROGERS. I understand that. I understand your soliciting views and so forth, but not conducting the seminar, necessarily, or the seafood industry conferences. This goes beyond a solicitation of views, in my mind. I won't pursue that at this time. Thank you, though, Doctor, and we appreciate your testimony and you know we all hold you in high regard.

Mr. HANNA (presiding). Let the record show that Mr. Lennon was called away from the committee to attend an executive session of the Interstate and Foreign Commerce Committee.

Mr. Schadeberg?

REORGANIZATION WITHOUT ADDITIONAL FUNDS

Mr. SCHADEBERG. Mr. Chairman, the main thing which must be done is to get started immediately. Even though adequate funds may not be available to accomplish the goals which the National Oceanic and Atmospheric Agency is to ultimately attain, there is a definite need to set the organization up and to have a shakedown. If we construct the framework of the agency now, some of the bugs will have been taken out of the machinery before we really start the vehicle moving. Thank you.

Mr. HANNA. Yes, I am particularly impressed by what the gentleman says because it seems to me that this committee has to be cognizant of certain established conditions of today. One example is the capabilities that we have developed in connection with the space program. They are now calling for reassignment because I can tell you from the reports in my district that those industries which were committed to the space program are finding that they have capabilities which are in excess of the requirements that NASA now puts upon them. That leaves them with capabilities that now have to be turned to some other activity and I think we have to recognize that that is a condition that exists in the society.

The question of money, it seems to me, cuts two ways. One, you have already suggested, Mr. Schadeberg, is that some of the activities which are already funded in existing agencies might be consolidated under one roof.

Secondly, it seems to me that a country, like an individual enterprise, must make investments with a view of reaching the promise and the opportunities that lie just ahead. The point is that you can't invest money to take advantage of opportunities that lie ahead. To that extent you are beginning to fall out of the game.

America can't at this stage afford to fall out of what is going on in the world in general. Another thing that I think we should immediately consider is that organization has both limitations and opportunities. Sometimes when we see chaos we think we ought to organize it. But by just giving it a name and structure and vitality sometimes what we get is organized chaos.

But the fact that it doesn't completely come together, just as you said, Mr. Schadeberg, the shaking down period as well as the building up period has to come. As an example, we call a country Peru. And because we call it a country, it ought to act like a country, it ought to be a country. To everybody from the outside it is a nation, but I have been there, and if you go into the section of Peru that is over the hill down along the Amazon, if you ask those people what they are, they will give you the name of an Indian tribe.

If you talk about the city of Lima, they never heard of it and if anybody is going to come from Lima they will look upon them with some askance and hope they go away pretty soon.

Agencies are like that, too. You put a group together and say, "You are HEW." But if you go to a particular section of HEW and ask what they are, they will give you the name of a particular agency, although to all we said, "You are HEW." By international law, we told those Indians on the Amazon, "You are Peruvians." However, if they don't act like it, if there is nothing that makes them a vital part of the nation, that means they haven't shaped up yet and they haven't either shaken down or shaped up, but the opportunity is there for them to be a nation.

They are given recognition as if they were, so there is every impetus for them to start acting like they were. It would seem to me when you make a law you have got to recognize that there are these limitations. Within these limitations there are opportunities, but they will or will not come on line quickly depending on how much real vitality there is in the kind of structure that you lay on it.

THE NEED FOR VISION

We have to make assumptions in the law. Lots of times the assumptions we make are based upon things already proven untrue. I think, for instance, in *Oliver Twist*, remember that delicious line when Mr. Bumble is being brought before the authorities? He points out it was his wife that was running that orphanage illegally, and the judge tells him, well, the law, Mr. Bumble, says that as you were the husband, you have dominion over the wife and it is assumed that you have complete control over her activities. Therefore you are responsible for them. He said, "Sir, if the law assumes that, the law is an ass."

Well, we assume sometimes that because we put somebody in charge of the agency that they have really dominion and authority over an activity within a substructure that sometimes is not demonstrably true, but the law assumes that and it has to assume that, and if that relationship doesn't prove out, we have got to make it prove out or change the basic assumption.

The other thing I think we can take a lesson from, you have got to get momentum to initiate a move, and that is based upon, usually, a romantic idea, because romanticism is what really moves people. I think about the history of my own State. The people came to California in the gold rush and the gold has been the least of the contribution of the State of California to the history of the Nation. Many of the people who went to California with the fire of the gold never were greatly disappointed because they didn't find nugget one. In fact, they got kicked around quite a bit until they decided there is a heck of a lot more here than just delving after the nuggets.

It seems to me if we go into the sea the way the people have undertaken any great adventure, that we will find tremendous potentials beyond the thing that initiates the momentum. There is plenty there that will have a continuum for the momentum, and we must remember that out of our history.

Sure, it took the gold rush to get the people moving West, but what they ultimately did when they got there was not dig for gold but to bring water to the land, and the agriculture that came out of California far surpassed in wealth what was ever dug out in gold. They realized that there has been far more in the environment that was

around there and what it could do for the people and expansion of the people's potential and made the ultimate contribution, and I think it would be the same for the sea.

Dr. WENK. Mr. Hanna, I have to agree with you completely on this. It turns out that there are some strong reasons, in my view, why the support for marine sciences and affairs deserves higher priority with regard to economic growth, with regard to the problems that our Nation and society as a whole faces, with regard to hunger, with regard to an increasing appetite for energy much of which has to be derived offshore, with regard to the problem of managing our coastal environment so that we don't end up with a sewer simply by moving the pollution down stream, feeling that the ocean has an infinite capacity to absorb it.

I think there is a strong rationale for establishing marine affairs at a higher priority.

But as we apply logic, I have to agree with you, we shouldn't squeeze out the spirit of exploration. We shouldn't try to rationalize every single thing we do on a cost benefit analysis, because beyond this there is a matter of vision and the long-range point of view. We have to acknowledge that we can't foresee all the returns we are going to get from the ocean.

We simply know from past experience that there is always more there than we see today.

Also, with regard to this matter of funding for marine sciences, I wanted to be realistic in indicating that as I saw it in the near future, we were not going to be in a position to fund at the level the Commission proposes. When you look at this in detail, they propose immediate large increases in the next few years, quite large; but I don't want to leave this committee with the impression that the Administration is not looking at marine sciences along with these other programs to determine whether or not the rationale that I have just presented to you makes it deserving of increased support in fiscal 1971.

I want to assure you that we are doing our best to make this case to the President, now—so that in any reallocation of priorities, there will be a rationale for some early increase in support for marine affairs.

Mr. HANNA. We have got a momentum now, based on what the committee has done, what you people have done. It seems to me you have got to keep the momentum and if we don't start moving with the program such as the chairman envisions, we are not going to have a momentum. I am not afraid where the future is going to take us. Some of the best things we ever did we stepped out knowing not what we were doing, and some of the things that we best planned we found out were based upon assumptions that were already proven to be untrue, only we didn't know it.

So I think the time is ripe to move, and I think you agree with me that we will never realize what you said about serving some of the great needs that are here, if we don't have this momentum. I am sure you agree with that.

Dr. WENK. Indeed I do, sir.

Mr. HANNA. Thank you. Mr. Lennon has returned and I turn the chair back to him.

Mr. LENNON (presiding). Thank you, Mr. Hanna.

THE MARINE SCIENCES COUNCIL AND MARINE SCIENCES COMMISSION

The life of the National Council began when, Dr. Wenk?

Dr. WENK. The first meeting of the National Council was August 17, 1966.

Mr. LENNON. You have been the executive secretary of the National Council since its formation?

Dr. WENK. Yes, sir. I had the privilege of being sworn into office that very day, at first meeting of the Council.

Mr. LENNON. And during the life of the Council in the prior Administrations, they worked very closely, did they not, doctor, with the Commission?

Dr. WENK. They worked closely, but, as I am sure you recognize, there was agreement from the very beginning that the Council and the Commission should be independent bodies—each in a sense having a different purpose; but there was very close cooperation between the two.

Mr. LENNON. Of course, you personally know something of the background of the gentlemen who served on the National Commission?

Dr. WENK. Yes, sir, I do.

Mr. LENNON. You know that after the President signed the act that two members of this committee directed a communication to the then President Johnson urging him to select the most competent, capable men in this field, and particularly those men who would give the time and had the dedication to bring a meaningful report to the Congress and to the President and to the country.

Is there any question in your mind about the capability and the background and the knowledge and the time and the dedication that these men spent in making the findings and ultimately their recommendations, conclusions, and recommendations to the President and to the Congress?

Dr. WENK. There is none whatsoever, Mr. Chairman. Not only did they bring their own personal experience and expertise to this Commission, but in my long experience in government, I have never seen a commission where the members themselves devoted the time and energy to this study as these members did.

Mr. LENNON. Now, you recall in the language of the act itself, the Commission was requested, or in fact mandated, to make its recommendations to the President and the Congress concerning their views on a Government structure and the type of Government structure if they recommended one. Now you raised the question, would such a Government structure provide better performance at the same or lower cost? What is your opinion as to whether or not such a Government structure could provide a better performance regardless of the cost?

Dr. WENK. I would have to answer affirmatively, Mr. Chairman, in regard to NOAA. For example, at the present time we have three civilian oceanographic fleets, the Coast Guard, Coast and Geodetic Survey and Bureau of Commercial Fisheries—

Mr. LENNON. At that point, you know that the National Council has been able to coordinate certain overlapping agencies. It has been able to do that, the National Council through its initiative has been called on to do that, and has accomplished that.

Dr. WENK. Yes, it has.

THE BENEFITS OF A NATIONAL OCEANIC AND ATMOSPHERIC AGENCY

Mr. LENNON. Do you not believe that a Government structure such as this would provide for a more coherent management and a higher quality of performance and have a tendency to attract even better personnel perhaps than we have today, because it was a single Government agency responding to the President and to the Congress rather than being proliferated through so many agencies, so many departments, and so many bureaus as it is today?

Dr. WENK. Well, as I said in my testimony, Mr. Lennon, I really believe that some consolidation along the lines proposed by the Commission would be clearly superior to the present organization, but on the premise that we agree on their goals. The Commission's proposed goals in a sense symbolize an elevation of the priority for our attention to the ocean, and I think that is the key point.

You know how I stand on this personally, Mr. Chairman. I believe that we need to raise that priority. But I have only one vote in this as one citizen. This, in a sense, has to be a national decision and I believe that we have waited a long time for that national decision, but I believe this is the way it has to be done.

Incidentally, let me say from my own trips around the country that there is a great sympathy for marine research. Everywhere I go I find this encouragement but that has to be articulated in some fashion that becomes part of the political process.

Simply encouraging support in the grass roots is not enough. I believe this committee—you have said yourself, Mr. Lennon, that you welcomed expressions of views from industry on this very point, and I believe that is the kind of indication the executive branch as well, needs in making its decisions.

Just what do the people want?

ALTERNATIVES TO A NATIONAL OCEANIC AND ATMOSPHERIC AGENCY

Mr. LENNON. You refer to a decade of preparation in the sixties and a decade of realization in the seventies. Do you have an alternative to what is suggested by the Commission as to how we might more likely accomplish the decade of realization than what is recommended by the Commission on Marine Science, Engineering, and Resources?

Dr. WENK. One of the alternatives, Mr. Chairman, would be to continue with the present structure of Government and with the council. As I look ahead, I can see some new steps and new accomplishments possible under the existing structure. **So this is one alternative.**

Mr. LENNON. Would you think a Government structure such as recommended by the Commission would improve decisionmaking in a central agency, or do you think you would get the decision just as well without any overlapping of the functions and roles and missions when they were proliferated among several agencies?

Dr. WENK. Again, if we think of this only in the context of marine and atmospheric sciences, then I think you are likely to get a better decision by the kind of organization they propose. But this is not without some possible adverse effects. When one looks at, for example, questions of transportation, I think it is important to recognize that there needs to be a much closer relationship of the marine mode of

transportation to that on land and air, and if you separate this or structure it too strongly, you may lose something insofar as policy decisions on transportation are concerned.

So what I am saying is in short, with NOAA you get better decisions in marine and atmospheric affairs. You have possible risks of poorer decisions in these other areas unless this is examined very carefully.

Mr. LENNON. How has the Commission's work reflected failure, say, of the Department of the Interior?

Dr. WENK. Well, first of all, I would like to go on record that I believe the Commission had a beneficial effect on affairs of Government as soon as it was formed because the kind of questions they were asking—even during their deliberations—because the kind of questions they were asking caused all of us to reappraise what we were doing.

Mr. LENNON. For the first time in history, after the commission's report, the Department of Interior established an Under Secretary for Marine Affairs, didn't they?

Dr. WENK. Well, they set up an office of Marine Affairs under an Assistant Secretary last fall. I am not sure what the causal relationships were here, but the coincidence is there.

Mr. LENNON. Do you think that was because in the commission's report it recommended that the Bureau of Commercial Fisheries and certain components of the Sports Fish and Wildlife be moved out of the Department of Interior into the NOAA? Do you think this motivated the Department of Interior to move in the direction of the marine area?

Dr. WENK. I have to admit that is one possibility, Mr. Chairman, but there is another problem that exists within the Department of Interior. At the same time that you recognize the difficulty of having 11 departments and agencies develop coherent and integrated programs across the Government, there is a similar problem within the Department of Interior on a different scale, because so many of their bureaus have some activity dealing with the sea, but might be following different paths. There is a need to coordinate the activities right within the Department of Interior and they recognize that.

Mr. LENNON. Vice President Agnew, I believe, submitted to the President in his communication of May 29 or thereabouts, the position of certain of the principal agencies of the Federal Government.

Dr. WENK. That is correct.

PROBLEMS IN REORGANIZATION

Mr. LENNON. Their objections to the Commission's report. The Department of Transportation was one of them, I believe, with respect to the proposal to remove the Coast Guard into what is suggested as NOAA. To what degree other than search and rescue, is the Coast Guard involved in transportation, like buses and trucks and railroads are?

Dr. WENK. The Coast Guard, I believe, has statutory responsibility with regard to approval of ship design for purposes of safety, and I believe also has responsibility to exercise some inspection in both ship construction and ship operation, so that they would be involved in those transportation related activities.

Mr. LENNON. Here is a question that has been handed to me. I don't have time to consider it before I pass it on to you.

On pages 19 and 20 you make reference to the losses affected agencies would suffer. You say this must be evaluated. Is the real question what DOT, Department of Transportation, or some other agency would lose, or what the Nation would gain? Maybe you had better stop there and answer that question. Are we considering what agencies would lose by this proposal or are we considering the broad spectrum of what the Nation would gain? Which do we do first?

Dr. WENK. Well, Mr. Chairman, the national interest has to come first, without any question, but in considering what the agencies would lose, my phraseology perhaps was poor. I did not mean to suggest this was simply to be evaluated in narrow, parochial interests of the agency in preserving their own stature, but rather the question of effectiveness of carrying out a statutory mission. I believe that the yardstick for evaluating these alternatives is only the national interest and not the question of preserving the integrity of an agency for its own sake.

Mr. LENNON. When you speak of the Department of Interior and think of their jurisdiction over, say, commercial fishing to fishing on the high seas, it is a little bit difficult to relate isn't it? Of course, you can relate it perhaps to sport fishing inland, but it is a little difficult to relate it to our commercial fishing fleet and the problems we are having in the Atlantic and Pacific.

Now, let's take the Department of Transportation. Suppose the Coast Guard was moved out of the Department of Transportation. How would the Department of Transportation suffer except for the fact it would lose the stature of the agency that had the greatest Government payroll or greatest Government personnel? How could it affect the Department of Transportation if the Coast Guard was moved out when only 4 percent of the activity of the Coast Guard is related to merchant marine? Isn't that true, according to the findings of the commission which is specifically so stated on page 237?

Dr. WENK. With regard to the Commission's report, this percentage of the Coast Guard's activity related to merchant marine inspection and safety, the percentage you cite is certainly correct, but there are a number of activities where the involvement of the Coast Guard with other sister agencies within the Department of Transportation is important, and let me recite one.

Incidentally, in so doing, I am not trying to make the case one way or the other, but just from the point of view of answering your question, the Department of Transportation was asked by the Marine Council to develop a plan for the future of navigation aids, recognizing that in order to develop this, there needed to be close collaboration between the Federal Aviation Agency and the Coast Guard. The technology that is involved here with regard to locating or keeping track of planes has application to the problem of keeping track of ships, especially as they enter crowded harbors.

So this would be the kind of benefit that could be obtained from these two agencies being within the same department.

Mr. LENNON. We do know that the Coast Guard is concerned about this, not only the Department of Transportation, because of the possible loss of lead agency based on Government personnel. They are concerned that in their everyday activities they would be subjugated, that the scientific and marine aspect would get superior emphasis. Of course, they have these well-defined statutory responsibilities on a day by day

basis, and they are concerned with that. They concede it would depend upon the administration of the new agency as to how they would get along.

If you had a person who recognized their statutory responsibilities as the head of the NOAA, they would have no real problems. But if they got someone there interested only in the scientific aspect of this total program, then they could be in some difficulty.

What other ways are there, short of NOAA that we can improve the effectiveness of our oceanographic efforts to meet the national goals set by the committee? You tell me specifically and definitively what ways other than the establishment of NOAA that we can improve the effectiveness of our effort to meet the national goals set by the Commission.

Now that may take you some time and you may want to think about it a little before you put it in writing and furnish it for the record.

ALTERNATIVES

Dr. WENK. If I could be permitted to, Mr. Chairman, I believe that is a very broad question and I believe that my response would be more meaningful if I could supply it for the record. It is one of the criteria by which one should test these alternatives and I believe we could respond with some comments as to what we could do to improve our present setup, short of NOAA.

Mr. LENNON. You suggest the possibility of establishment of Department of Natural Resources and Environment with strong marine emphasis. Do you recommend that or do you just suggest that as an alternative?

Dr. WENK. I only suggest that as an alternative because it has been raised by others.

Mr. LENNON. I would like to have your complete views and proposal with respect to that. Not just a suggestion. You see, we have no more suggestions in this Commission report. One of the purposes of creating the Commission and the President appointing it was to make recommendations for a new marine science organization. After two and a half years of study, I am convinced that they considered all the criteria that you propose now as alternatives. Now you come up and say, well, now, five, six, seven, eight, or 10 alternatives to what they propose, and yet their proposal represents approximately two and a half years of study at every level.

Now you say, well now, you ought to think about other alternatives, but it doesn't represent the study and consideration of these proposals and alternatives that you recommend that the Commission report does.

Is that a fair assertion?

Dr. WENK. In supplementing the colloquy on alternatives to NOAA, two others are possible that I did not mention previously:

(a) Continuing the Marine Sciences Council with certain changes, and

(b) Creation of a Department of Resources and Environment with a strong marine component.

If the Marine Council were continued and the present structure of Government otherwise not significantly altered, the marine program could be strengthened by the Council being authorized to receive some

appropriations for programs that would subsequently be reallocated to the operating agencies and devoted to priorities developed by the President and the Council.

A second possibility would be to continue the Council as a planning and innovative body, utilize the device of "lead agency assignments." Here programs involving several agencies would be coordinated by a designated lead agency who would provide the leadership and staff necessary to assure that the individual agency resources are mobilized to meet Government-wide goals. This imposes an obligation on the lead agency to strengthen its own program management accordingly and be prepared to devise the Government-wide program both within the Government and to the Congress. In my view, such an arrangement would not provide for the high-level of attention to the oceans that would be afforded by an independent agency such as NOAA that would offer visibility to a whole spectrum of marine activities, that is the marine component in a lead agency would necessarily still be subordinate to that agency's total mission of which the marine component is but a small part.

The establishment of a Department of Resources and Environment with a strong marine component could be a viable alternative to NOAA, but such a development would necessarily require far more extensive reorganization than proposed by the Commission and would encounter more severe opposition and delay. The Commission noted that a NOAA could be brought into such a broader structure at a later date without prejudice either to the effectiveness of NOAA or to a new parent Department. In fact, this might be one way of assuring that the marine component derive the strength the Commission sought.

I think the Commission itself must have considered these alternatives and rejected them.

Mr. LENNON. You say they did?

Dr. WENK. I feel they must have.

Mr. LENNON. That is my understanding.

Dr. WENK. But the deliberations are not reflected in their report and this therefore leaves those who have decisions to make—and I am now speaking for the executive branch—with the need themselves for reciting these alternatives and evaluating the pros and cons of each.

The ones that I recite here are all well known alternatives and I don't mean to suggest a single one as original.

Mr. LENNON. While you establish independent committees on this Council—and rightly so—did there constantly go on a dialog between members of the Council, particularly you and Sam Lawrence, the Executive Secretary of the Commission and Dr. Stratton and other members of the Commission in which you raised these questions, and do other members of your staff raise these questions about what are the other alternatives and why did you reject these alternatives?

Certainly you all were not too far apart physically located, were you?

Dr. WENK. You are absolutely right, Mr. Chairman, and this did happen. As a matter of fact, last September almost exactly 1 year ago, I convened a group of senior officials of the executive branch for 1 week away from Washington so as to be free of distraction, and asked them to provide at Chairman Stratton's request an interim commentary to the Commission on their preliminary recommendations,

There were a number of suggestions, and these were then communicated to Dr. Stratton informally at the end of that week. He spent, I believe, a full day with us; and I felt after the discussion that he welcomed this opportunity.

A number of the comments that were made by this task group were then examined and are reflected in the Commission report. But not all. The Commission was confronted with two problems: No. 1, time running out, but second, they have come up with quite a comprehensive report of almost 250 pages already. If they had done all the things that were proposed, it might be quite a bit larger.

VIEWS ON THE PROPOSED NATIONAL OCEANIC AND ATMOSPHERIC AGENCY

Mr. LENNON. There were three Government agencies represented on the Commission: Department of Interior at the undersecretary level, there was a representative of the Department of the Navy at the undersecretary level, and of course, the Department of Commerce, most particularly the environmental science services agency was represented by Dr. White.

Dr. WENK. Yes.

Mr. LENNON. They did not join in the recommendations with respect to the Government structure. They abstained from expressing their views. But since that time and since the change in administration, am I not correct when I say that one and possibly two of them have expressed their belief that this was the right direction? There are no institutional restraints or inhibitions as there were before.

Dr. WENK. Under Secretary of Navy Baird has gone very strongly on record in support of NOAA.

Mr. LENNON. I guess he could. It doesn't affect the Navy. That is human nature. It is the same all over the world.

Well, we will certainly be interested, Doctor, in obtaining your views as we move along in the consideration of this important Commission's report. I am very hopeful. I don't know how effective I can be in hoping that this committee of the House may find a reasonable consensus on this subject during the present session of the Congress.

Mr. Counsel, you, hopefully, have some questions you would like to get answered.

INCREASING EMPHASIS ON THE OCEAN

Mr. CLINGAN. I have one or two. I would like to go back, Doctor, if I may, to the question of funding and have you clarify one or two points. The first is, if I may use your analogy, your reference to the mechanism and amounts of gas necessary to run it.

If I can use that analogy to pose my question, is it not true, were it not for the automobile there would not be any need for gas? To put it more precisely, would you not agree that if there were a centralized organization for management of ocean affairs that there would be a stronger voice for more gas, and this might be beneficial in that respect?

Dr. WENK. Mr. Clingan, I have to again respond affirmatively on this point about advocacy for marine affairs. I believe the Council has done an outstanding job in calling attention to those within the Government and outside, of the importance of the oceans. As I look back over these 3 years, I see this response developing in many, many

ways that were unpredictable, but all in terms of interpreting this mandate of the Congress of trying to make the ocean serve people. We were able to empty that mandate to bring about a remarkable transition from what had previously been only scientific oceanography. When you go through to this next step of trying to achieve the goals which the Commission set forth with the increased funding, I come back again to my earlier point.

I believe that a consolidation of these elements—now in several different agencies and each at a relatively lower level in each agency—that this consolidation would gain the greater effect that the Commission proposed.

FUNDING FOR MARINE PROGRAMS SINCE THE COUNCIL WAS ESTABLISHED

Mr. CLINGAN. Mr. Lennon has referred to the gains that the Committee hoped to achieve by creating the Council. Can you give us some idea of how the funding in oceanography has increased since the creation of the Council?

Dr. WENK. Yes. I can't recite this from memory, but my recollection, Mr. Clingan, is that the fiscal year immediately preceding the activation of the Council the funding level was around \$333 million. That is fiscal 1966. The proposed level for fiscal 1970 was over \$520, but in view of the number of cuts it may end up being around \$500. So, even allowing for some minor adjustments in accounting, there has been in those 4 years of from 40- to a 50-percent increase.

Mr. CLINGAN. And you would attribute this to the coordinating effect of the Council?

Dr. WENK. I don't want to claim full credit for this, because the agencies themselves developed programs and in turn are obliged to defend their budgets to the Bureau and to Congress. But I think it is fair to say that the Council—the leadership provided by its chairman—and the effect that it has in the Executive Office inevitably had some effect of not just getting more money, but relating to marine issues to our national concerns. This is what we tried so hard to do: to point out that the quality of our environment and economic growth, national security, and keeping our evolving international affairs free of conflict, depend significantly on the oceans. This was elevating this whole enterprise above its previous concern when it was focused almost entirely on science. So, if I were to look back in terms of what the Council has done itself, that rather than just getting more funds we oriented science to serve social and economic goals. But we did get more money, too.

ECONOMIC BENEFITS FROM MARINE INVESTMENTS

Mr. CLINGAN. Thank you. One other question. Let me say that it is my understanding that the whole program has to do with encouraging incentive for industry to move into the oceans by providing programs. Is that correct?

Dr. WENK. Yes, sir.

Mr. CLINGAN. Now, would this not result in a substantial increase in gross national products?

Dr. WENK. I believe it would without any question.

Mr. CLINGAN. So when we talk about needing additional funds, the potential for high cost, must we not also consider the potential for national gain?

Dr. WENK. Well, in every case, I believe, that the payoff for investments in marine sciences is significant, predictable and, in relation to a number of other areas in which we are funding today, subject to demonstrated superiority. But at the same time, Mr. Clingan, the problem is that we just don't have enough money to do all the things that are desirable and which also have this predictable payoff, and that is at least the short term constraint as we meet this inflation problem.

SUPPORT FOR A NATIONAL OCEANIC AND ATMOSPHERIC AGENCY

Mr. CLINGAN. I understand that. Thank you.

Just to shift off the subject of funds very briefly, you have referred to Congress as a mirror of consensus. Also in your discussion you referred to a certain amount of sympathy among the industry. I am sure that you have read all of the testimony before this subcommittee so far.

Dr. WENK. Yes.

Mr. CLINGAN. I am sure you are aware also that the former chairman of the Council has gone strongly on record supporting the concept of NOAA. Are you not?

Dr. WENK. Yes.

Mr. CLINGAN. Are you aware of the poll of the National Oceanography Association with respect to NOAA? If I may, I will just refresh your memory on that questionnaire in mid-February representing 115 NOA corporation members, and 148 individuals of the corporate members; 82 percent supported the proposal for NOAA and the individuals backed it by 80 percent.

In addition, I would like to mention that in the May-June issue of Oceanology magazine, which reported the results of their poll of 602 ocean scientists: to the question, do you agree that one strong organization can be more effective in attaining this goal than many small special interest groups, and 67 percent said "yes"; "no" 33 percent.

Don't you think that these things indicate the growing of the kind of consensus that you are talking about?

Dr. WENK. I do indeed, Mr. Clingan, and I was aware of many of these statistics. Although I have not seen the latest poll taken by NOA, I think this is enormously valuable. This in essence reveals more dramatically than I could have, the meaning of my comment about the Congress being a mirror of consensus.

I want to note though that the executive branch is itself endeavoring to determine what the feeling is outside of the Federal Government with regard to this matter of national priorities and this involves not simply marine sciences but all of our concerns which require Federal intervention, and I am sure that this will be taken into account.

I understand your point with regard to the Ash committee, but I am obliged to note that that is the advisory group that has the responsibility for the President to determine whether or not you can meet these national priorities better by reorganizing either for the oceans or for whatever other proposals are deemed of high priority.

I guess what I am saying in a nutshell is that the test for this first lies in what is important to the Nation and on this my position is clear.

Mr. CLINGAN. Of course I don't need to remind you that it is also the Council's statutory responsibility to advise the President on priorities.

Dr. WENK. That is right.

Mr. CLINGAN. Thank you.

CONGRESSIONAL INTEREST IN MARINE AFFAIRS ORGANIZATION

Mr. LENNON. Doctor, how long would you say that we have been trying to organize the so-called marine sciences at the national level?

Dr. WENK. Well, the initiative of the Congress that I am acquainted with dates back to about 1959 or 1960. In fact, the report of the National Academy of Sciences that was released in January of 1960 found instant response in the legislative branch, and my recollection is that there were some bills introduced by some of your colleagues about that time and interest by this particular committee very shortly thereafter. There has been continued interest since that time, so I would date this back to about 10 years.

Mr. LENNON. And yet it is suggested that to reorganize hastily would be counterproductive 10 years later. I agree to reorganize hastily would be counterproductive, but we will have to admit we spent 10 years trying to reach some area of agreement as to how you can organize at the Federal level the vast spectrum of marine sciences.

THE COASTAL ZONE

Now, you talked quite a bit about our coastal zone. That has received considerable attention from many of our coastal States; and they are greatly interested in it, but who is going to provide the leadership in this area of coastal zones unless it is at the Federal level? How can interstate compacts be worked out on coastal zones where they both extend beyond the State boundaries and State lines or in political subdivisions as in New York State, where even the new municipalities own the so-called high water level mark down to the low water. How else can it be done except through a Federal agency and won't you have to have a Government structure such as you talked about in NOAA to implement this proposal. Everybody agrees when you move in the direction of coastal zones and regional laboratories and so forth—won't we have to have a Government structure other than what we have got now?

Dr. WENK. Let me say I am in complete accord with your view that leadership in dealing with coastal zone matters has to come from the Federal Government. We recognize that the coastal lands and waters are held in trust for the citizen by the States, but insofar as guidance is concerned, encouraging the States themselves to organize better within their own State governments and to develop the political courage that is going to be necessary to face some of these zoning issues, may have to come from the Federal Government.

So let me say first, I agree with that point completely. The second is where in the Federal Government do we do this? This is a question

that is being examined now in the executive branch with regard to this matter of State-managed coastal zone authorities.

They would be meaningless unless there were some clearly identified center or focus within the constellation of Federal agencies to do this, and there have been several alternatives proposed short of NOAA.

The Department of the Interior is one; the Marine Science Council is another. So there would be some alternatives. The problem is compounded by the fact that within the Federal Government so many different Federal agencies are involved in the coastal zone. Everybody is doing his thing there.

Mr. LENNON. You see, one of the difficulties that the Members of the Senate and Members of the House have, who represent coastal areas. I think it was about, when, 1899, that the Congress enacted the law that authorized the Corps of Engineers to issue dredging permits if it did not interfere with or obstruct navigation, and there was a tremendous number of those old applications pouring into the Corps of Engineers.

Then, I believe in 1967, the Secretary of the Army, acting for the U.S. Corps of Engineers and the Secretary of the Interior, under an Executive order of the President, entered into a memorandum of understanding that the Corps of Engineers would not issue dredging permits unless it met with the approval of the regional director of the Department of Interior who had to correlate it and coordinate it with the Department of the Interior. Now, no one knows which way to move.

The Corps of Engineers says, "We are stymied, we don't know what to do. We wish we hadn't been burdened with this." Here is a man who owns a land, a king's grant, say, from the shoreline out to the Atlantic coastal waterways and he wants to dredge to get a little motor boat out there. He applies for a dredging permit. They object at the Department of Interior level. Then he has to go into Federal court, the expense of going into Federal court to seek a writ of mandamus. Then the question of the ownership of the land comes in.

Dr. WENK. Your very point, Mr. Chairman, reflects the complexity of dealing with coastal zone issues because of the multiple purposes that these coastal resources serve and inevitably the conflicts that arise not only among the different users, but among the Federal agencies themselves, each of which up to this time has been obliged to look at one single purpose of these coastal resources.

You put your finger on the very problem we face and I believe we have some solutions for this.

Mr. LENNON. Well, I am thankful you have a special panel making recommendations related to the coastal zone authorities. In my proposal to the Governors from all the coastal and lake States on this question, I pointed out to them some of the areas of discussion they can expect when they come here for that 2 day conference. You have provided me with a hope that your panel would be in a position to give us in writing by October 1 your specific direction that you think we should go and legislate at the Federal level that would implement what is recommended, and which you agree is the movement for the coastal zone authorities.

Dr. WENK. Mr. Chairman, you are putting me on the spot——

Mr. LENNON. I am trying to.

Dr. WENK. In this regard because the task group isn't enjoined to report to the committee for policy review by October 1, and their recommendations then going through the Council must first find their way to the President.

Mr. LENNON. You mean you are not permitted to let us use them in conferring with these people who come here? What we are doing, Doctor, we are helping the administration. This is an innovation for the legislative branch of Government to do what we propose to do. We ought not to have to do it. It should have been done by the executive branch of the Government. But they haven't done it, and we believe that action is necessary now.

We consider the commission recommendation's not a mandate, but a commission and they are not very explicit how we should move in the direction of implementing their recommendations with respect to the coastal zone authority. I agree with you, it is in a gray or twilight zone.

But nevertheless it is in the Report and a number of the coastal zone States are seizing on this. When they come to Washington on October 28 and 29, they are going to expect some leadership, and I am so happy that that panel will be able to provide it. But if I go to the forum and say, "Now this panel was created by the President, your President," a lot of them will be from Republican States, "but they won't let us see this recommendation. It has to go through all the channels up to the White House before it can be approved or disapproved and come back down the ladder for we ordinary Americans to know what is going on."

Dr. WENK. This is a form of gestation, Mr. Chairman, that takes place before any eggs hatch. And I don't believe there is anyway to accelerate that process. However, I would be pleased to carry back your interest in having some message from the executive branch and perhaps even from the President by the time of your meeting late in October, that would in some way reflect the findings of this task group.

Mr. LENNON. I just don't want to go before them and say, "We can't get a thing out of the record on this subject."

Dr. WENK. I hope I can make it unnecessary for you to make that statement, Mr. Chairman.

Mr. LENNON. As a matter of fact, happily, I am reminded that you are going to be the moderator, and I will be there to ask you some questions. You have so kindly consented to be the moderator at our hearings on the first panel.

Dr. Stratton will be here, Sam Lawrence, the former chairman of the panel on ocean management is going to be there too. I imagine it will be very good.

Dr. WENK. Well, Mr. Chairman, we want to be helpful in any way we can, and I believe the main problem I was sharing with you here was this question of the stage of development of these recommendations. Despite the promptness with which I expect this task group to report, their recommendations would naturally have to find their way to the Council and the President in due course, and here is a case where I simply do not know at what time scale these would be made a matter of Presidential enunciation.

SUPPORT OF COMMITTEE FOR THE NATIONAL OCEANIC AND ATMOSPHERIC
AGENCY

Mr. LENNON. I don't want you to get the impression, Doctor, that because of the absence of so many members of this subcommittee this morning that it is a lack of interest on the part of these individual subcommittee members. It just so happens that there are so many committees of which our members are members that are in executive session this morning, on needed pieces of legislation. That is the reason I am about to say, and can say with some degree of immunity, there is about complete consensus. If you polled the members of this subcommittee, I don't think you would find three who weren't determined to move in the direction of the recommendation of the Commission's report. That is my considered judgment. And on this side of the aisle I think it is 100 percent and I don't know but one or two over on this side that are not 100 percent.

I think there would be complete unanimity and if you could just carry that report back to your officer and say this to him: Let's work together on this thing, if we can. We worked together in the past and we accomplished something in all these years. I just feel like we can again. In fact I feel like we must.

Dr. WENK. Mr. Chairman, I think the cooperation between the two branches of Government has been one of the most gratifying parts of this entire program and gratifying to me personally that we have made the progress we have; because of that joint interest, let me say, the kind of report that I made to you this morning; and in turn the comments by you and your colleagues in no way negate that spirit of cooperation between the two branches. You can be sure of our continued cooperation. I want to assure you that I intend to carry back to the members of the Council and its Chairman comments that you have offered here this morning, and if I may, criticisms, and I think they will be interested in knowing what you think of the present status of the program.

Mr. LENNON. I say further that this subcommittee, or at least a number of its members on both sides of the aisle—many times will sit down in an informal executive session with you and the other members of the Council and share each other's views. Sometimes we have found that to be helpful in the past, hasn't it?

Dr. WENK. It has.

Mr. LENNON. Thank you very much, Doctor.

The hearings will continue on Thursday. The next scheduled hearing before this subcommittee will be Thursday, September 18, at 10 a.m. here. At that time we will hear testimony from the Honorable James M. Beggs, Under Secretary of Transportation. The hearing previously scheduled for tomorrow will be rescheduled for reasons beyond our control.

With that the committee stands recessed until Thursday morning at 10 o'clock. Thank you for your attention.

(Whereupon, at 12:40 p.m. the subcommittee recessed, to reconvene at 10 a.m., Thursday, September 18, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

THURSDAY, SEPTEMBER 18, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY,
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:20 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The subcommittee will come to order.

This morning we are very privileged to have as our principal witness the Honorable James M. Beggs, the Under Secretary of the Department of Transportation.

Mr. Secretary, if you will come forward, sir, and if you have any associates you desire to bring to the witness table with you, you may do so.

STATEMENT OF JAMES M. BEGGS, UNDER SECRETARY, DEPARTMENT OF TRANSPORTATION; ACCOMPANIED BY VICE ADM. PAUL E. TRIMBLE, USCG, ASSISTANT COMMANDANT, U.S. COAST GUARD, DEPARTMENT OF TRANSPORTATION

Mr. BEGGS. Yes, Mr. Chairman, I have with me this morning Adm. Paul E. Trimble from the Coast Guard.

Mr. LENNON. If there are any others that you desire to have at the table with you, will you identify them at the time.

Mr. BEGGS. Yes, sir.

Mr. LENNON. Mr. Secretary, you do have a prepared statement, and if you will proceed, we will be delighted to hear from you, sir.

Mr. BEGGS. Thank you, Mr. Chairman.

Mr. Chairman and members of the committee, I am pleased to present today the views of the Department of Transportation on the report of the Commission on Marine Science, Engineering and Resources and on H.R. 13247, a bill to implement certain organizational recommendations of the Commission.

As you know, the Department of Transportation and its constituent administrations have participated actively in the Nation's marine and atmospheric programs and would be directly affected by the implementation of many of the recommendations set forth in the Commission's report. We have, therefore, carefully considered the reports.

Mr. LENNON. Right at that point let me ask you, have you personally read the Commission's report?

Mr. BEGGS. Yes, sir; I have.

Mr. LENNON. And the panel reports such as are in print and are available?

Mr. BEGGS. I have not read in great detail the panel reports. I have read the Commission report in its entirety, and I have scanned the panel reports.

Mr. LENNON. I hope you will have the opportunity to consider them in some substance and detail before we have the opportunity to hear you again. Thank you. You may proceed.

Mr. BEGGS. Yes, sir.

In May, President Nixon referred the organizational recommendations set forth in chapter 7 of the Commission's report to his Advisory Council on Executive Organization chaired by Mr. Roy L. Ash.

Mr. LENNON. At that point, Mr. Secretary, I will do the same thing that I did yesterday, just to keep the record straight.

On February 17 of this year, the President requested the National Council on Marine Resources and Engineering Development, headed by Vice President Agnew, to make some consideration of the Commission's report, and on March 27 of this year the Vice President responded to the President by letter, a copy of which was put in the record yesterday, in which he, among other things, sets forth the position of several agencies including the Department of Transportation, Departments of Commerce, Defense, and one other agency.

When the appropriate time comes, we will put that in the record.

In connection with your statement which you just made concerning the President's referral of the organizational structure recommendations set forth in chapter 7 of the Commission's report to his Advisory Council on executive organization, chaired by Mr. Roy L. Ash, we have a copy of that memorandum of that date which also was put in the record yesterday, and there was some sense of urgency I gathered from that memorandum for the Ash committee to study this matter.

We were concerned and anxious to know what would be the position of the Ash committee or when it would be in position to make some definitive and positive statement concerning its consideration of the Commission report.

So on September 10, just a little more than a week ago, counsel the subcommittee, contacted the executive director of this so-called Ash Commission and asked him when they would be in a position, having been requested, I remind you, having been requested, as you have indicated, on May 19 by the President to make this study, and we assumed that in a period of 4 months that they likely would be in a position to make some statement to the committee.

You can understand our disappointment when they advised us by letter dated September 11 to the effect that they hoped sometime to launch a study within the next month or two; in other words, they think they will get ready to start to begin to commence in about 2 months from now what the President explicitly asked them to do back in May.

I know you are familiar with that.

Now, do you want to tell us why the Ash Commission has not responded to the President's, the Chief Executive of this country, request from early May until now in late September and now say that perhaps in another month or two they may get around to considering

it, and therefore, if they do sometime—well, he just says, “We can’t be in a position to even estimate when we might be able to do this.”

Do you want to comment on that?

Is that the way to run a government or run a railroad or run a steamship line or run a Department of Transportation or run a commission?

Just talk about it in any way you want and then proceed with your statement, please.

Mr. BEGGS. Mr. Chairman, I don’t think I can comment on the priorities that Mr. Ash has set for his Advisory Council in the consideration of the various organizational matters which have been referred to him. It is my understanding that this was one of several requests made to the Council for their consideration. It is also my understanding that this is not the only avenue that this administration is employing to consider both the organizational implications and the other implications of the report of the Marine Resources Commission. There is currently a study underway in the White House staff considering many of the recommendations of the Marine Science Commission, and my understanding is that there will be an independent view developed, that is, independent of the Ash Advisory Council, at some date.

I don’t think a date has been set for that either. Although there is a strong feeling that the major initiative that is posed here by the Commission on Marine Science, Engineering and Resources is something that is of great interest to the administration, it is felt that it needs very detailed study before we arrive at conclusions.

Mr. LENNON. Mr. Secretary, now if you want to return to line 12 of your statement, you may proceed with the statement.

Mr. BEGGS. This Council is to explore the whole range of problems relating to executive branch organization and to advise the President on the Commission’s proposals while taking into account related problems of Government organization.

Pending the completion of the Advisory Council’s review and the development of the administration’s position on executive organization for marine and atmospheric matters, it would not be appropriate for me to discuss the organizational aspects of the Commission’s recommendations in detail. I will, however, later in this statement, comment on the effect on the Department of Transportation of the enactment of H.R. 13247 and bring to your attention certain considerations which very much concern the Department.

The bulk of the Commission’s report deals, however, not with organization but with the scope and content of problems facing the Nation in the utilization of our oceans and their resources. We in the Department of Transportation are most impressed with the size of the task which the Commission undertook and the substantial accomplishment which its report reflects.

While the recommendations of the Commission are praiseworthy and represent the carefully assembled viewpoints of a large number of highly intelligent and qualified people, there is no ranking of the priorities which should be assigned these goals, either in regard each to the other, or more importantly, in regard to other national goals. This is not intended as a criticism of Dr. Stratton’s Commission. This

was not their task. But it is the first order task which faces all of us now.

It has been our experience that organization should be adapted to the job to be done and we sincerely feel that it would be advantageous for all concerned to give primary attention at this time to the program substance of the report. Issues relating to organization can then be taken up in the context of agreed-upon programs and priorities. I would like to mention a few of the program areas of greatest concern to the Department of Transportation.

Of all the recommendations made by the Commission, those pertaining to coastal zone management and Great Lakes restoration were of the highest order of importance to the Nation. Most of our people live near water, salt or fresh. Most of our pressing national problems are rooted in the congestion of people and the conflict of needs which congestion brings.

We agree with the Commission's view that management of the coastal zone is a State matter, with the Federal role limited to grants and providing national policy direction. There are, of course, certain national considerations such as navigation and commerce which should continue to transcend State authority. An early and authoritative consultation with the States on how best to develop and redevelop the coastal zone is certainly in order. The Department would be pleased to participate in such consultations.

Our increased emphasis on pollution prevention, detection, and control, our development of a National Navigation Plan, our increasing port safety and law enforcement work are but a part of what needs to be done.

Certainly, in any ordering of priorities, the abatement of the pollution of our waters and our atmosphere rank as major national goals. The Great Lakes are in a particularly precarious position and the recommendation of the Commission for a pilot program should certainly be considered as one step in addressing this problem.

Another matter that is of major national importance is the determination of a regime for the deep ocean floor. I do not have to recapitulate the events which have led to the present activities of the Seabeds Committee of the General Assembly. It is important to recognize that any regime which is agreed upon will have a great impact, not only upon the development of marine resources, but upon the other uses of the oceans.

Since a major use of the oceans is and will continue to be marine transportation, it is essential that the regime developed not be incompatible with this use. The world knows very little of what resources are recoverable from the oceans. We fear that precipitous decisions based only upon fond hopes as to what the oceans might contain would do major harm. Our first need is for a timely inventory of these resources.

In view of the considerable international interest in the seabeds—which has to a large degree been engendered by an as yet unsupported appraisal of the ocean's resource potential—it is essential that we proceed now to develop the factual base from which an intelligent and workable regime can be derived.

The Commission very strongly emphasized the need for a better understanding of oceanic and atmospheric interrelationships. Among

the most pressing needs for such understanding are those relating to improved weather forecasting. Such an understanding may also culminate in an ability to abate or diminish some of the natural catastrophes which are so costly in human life and our national wealth.

The cost to the Nation of Hurricane Betsy alone was over a billion dollars and we have not yet reckoned the costs of Camille. We can ill afford to suffer such losses.

As our coastal zone becomes more and more heavily populated and industrial activities proliferate, the potential for loss becomes even greater. Improved weather forecasting is also a matter of great concern to the various transportation modes, and the Federal Aviation Administration and the Coast Guard cooperate very closely with the Environmental Sciences Services Administration.

While these areas of endeavor would be high on any priority list of the Department's, we recognize that a different perspective might result in a different ranking. The point, however, is that some ranking is essential if we are to move forward with the resources and organization necessary to the achievement of national oceanic and atmospheric objectives.

I would now like to discuss some of the direct effects of the Commission's organizational recommendations, and H.R. 13247, on our Department.

The Department of Transportation was created in 1966, with strong support in the Congress, and the Secretary of Transportation assumed his full responsibilities under the Department of Transportation Act on April 1, 1967. This legislation for the first time brought into being an executive department concerned with fostering safety and efficiency in a field of national activity involving more than one-fifth of the gross national product of the country.

The Department is still very young, and the benefits of consolidating the bulk of the Nation's transportation functions under a single Cabinet Secretary are only beginning to emerge. The Nation now has, however, the organizational framework for developing a balanced, healthy, efficient, and safe national transportation system.

The safe and efficient movement of people and goods was the single most important objective of the Department of Transportation Act, and it placed under the Secretary most Government functions necessary to achieve that objective. The entire Federal Aviation Agency, previously independent, became an integral part of the Department as did the Coast Guard which, for many years, had been a part of the Department of the Treasury.

In addition to these elements, all responsibility relating to automobile safety standards, highway safety, safety of motor carriers, railroad safety, and pipeline safety were lodged in the Department.

Placing these functions under a single official enables us to deal effectively with the intermodal characteristics of providing navigation aids, conducting search and rescue, handling of hazardous materials, conducting investigatory and regulatory processes, and so forth. The Secretary of Transportation can now bring consistency and strength into the Government's transportation safety programs regardless of the mode of transportation involved. One relationship which has become particularly apparent is the similarity between the roles of the Coast Guard and the FAA, which perform analogous

functions relating to the safety of the marine and air transportation modes.

Having succeeded in bringing the Federal transportation programs together, we view with great concern the proposal to move one of the key transportation agencies, the Coast Guard, to another location of the executive branch. Such a move strikes at the very reasons for the existence of the Department of Transportation Act. Therefore, while we support measures which will foster improved coordination of matters which bear directly on the advancement of marine science, engineering, and resource development, we strongly object to the movement from the Department of operational activities relating to transportation safety and efficiency.

There may be those who would question whether the Coast Guard is primarily concerned with transportation. We can best answer by reviewing the principal missions of the Coast Guard in time of peace. They fall into a logical pattern consisting of three major functions—law enforcement, maritime safety, and military readiness, the first two of which are inseparably related to marine transportation.

The Coast Guard is the general maritime police agency of the Federal Government. its responsibility in this field as defined by Congress in 1936 embodies the enforcement of all Federal laws upon the high seas and the navigable waters of the United States and its territories. In addition to the laws designed to regulate and promote navigation they include a broad spectrum of criminal law, oil pollution enforcement, port safety, conservation laws and many others.

The second major function of the Coast Guard in normal times is that of maritime safety. The Coast Guard is the principal maritime safety agency of the United States and responsible for setting standards for the merchant marine, boating safety, search and rescue, aids to navigation, port safety, and domestic icebreaking—to name some major areas of operations.

The “marine science” tasks which the Coast Guard now undertakes are also mostly related to transportation safety, for example, the National Data Buoy System Development Project is aimed at understanding better the environment in which transportation is done.

Among other maritime safety activities of the Coast Guard are its administration of laws and regulations related to the inspection of merchant vessels and their safety equipment, as well as the licensing and certification of their officers and crews.

These inspection activities include the review of plans for construction or alteration of merchant vessels; the periodic inspection of ships and their equipment; the inspection and approval of lifesaving and firefighting equipment; the supervision and enforcement of discipline on merchant vessels; and the investigation of marine casualties and accidents.

The Coast Guard also makes a major contribution to the prevention of marine casualties through its operation of the country's extensive and complex system of aids to navigation. These include lighthouses, lightships, offshore structures, fog signals and buoys as well as sophisticated electronic systems serving both sea and air.

Maritime safety considerations also have strong international implications. The Coast Guard is the United States' principal technical advisor with regard to the Intergovernmental Maritime Consultative

Organization. Through IMCO, the Safety of Life at Sea Convention is under continuing review and in addition to these regulations, IMCO makes recommendations as to safety procedures. The Coast Guard is also involved with the International Association of Lighthouse Authorities, the International Civil Aviation Organization, the International Ice Patrol, and the enforcement of international treaties and conventions concerning the fisheries.

The third major responsibility of the Coast Guard, of course, is that of maintaining its personnel and facilities in a state of military readiness as a member of the Armed Forces of the United States.

Beyond this, the Coast Guard is deeply involved in marine science and technology, and would expect to play an expanded role as part of a total national program. It is prepared to play such a role by virtue of a large floating plant, support bases around our coasts, an effective marine communications network, a high level of expertise in marine matters, and a dedicated organization skilled in developing and executing programs.

Thus, the Department would encourage the fullest possible involvement of the Coast Guard in marine science and technology matters. But moving 43,000 military and civilian personnel, along with large transportation and national defense programs, to a new independent agency could seriously damage the Nation's ability to carry out its transportation functions, and it would not necessarily contribute to the achievement of our national goals in marine science.

I have indicated that it would not be appropriate under present circumstances to go into the specifics of alternative organizational arrangements for the conduct of marine science programs. I suggest, however, that the combination of scientific and operational programs in one agency may impair the effective administration of either activity.

Experience indicates that the two do not mix well. We think that major Government programs involving continuing services to the public should be kept under the Cabinet departments where they can be effectively coordinated under the general oversight of the President.

In closing, I would like to affirm our support both of a strengthened Federal program aimed at developing the resources of the oceans, and of appropriate organizational measures designed to assure coordination and leadership of marine science activities.

Some time ago our Department examined its position regarding marine science, marine engineering, and marine resource development, as defined by section 8 of Public Law 89-454. In December 1967, the Secretary approved and published the following statement of policy :

In order to respond to national goals in a manner commensurate with its capacity and its missions, the Department of Transportation marine science program shall :

Identify, support and, as necessary, plan and implement policies and programs in furtherance of the Department's transportation and marine science responsibilities.

Press for the development within the Department of an improved research and development capability in the marine sciences, supported by a permanent staff of scientific and technical personnel having the highest possible level of professional competence and experience.

Accept responsibility to provide services in support of validated marine science projects within its capabilities.

Seek funds for additional capability for the marine sciences where there is a relative scientific technical or operational void in the Federal establishment and where management by the Department can be clearly cost-effective and in the national interest.

We believe this policy is in complete accord with the objectives of H.R. 13247 and the commission's report, and reflects the close relationship of those objectives to our national transportation objectives. We are convinced that, without impairing the unified direction of the Government's transportation functions by removing the Coast Guard from the Department, we can continue to efficiently and effectively serve the national interests in both marine science, engineering and resources, and in transportation.

This concludes my prepared statement, Mr. Chairman. I shall be pleased to answer any questions the committee may have.

Mr. LENNON. Thank you, Mr. Secretary. The gentleman from Ohio, Mr. Mosher.

Mr. MOSHER. Well, first, Mr. Chairman, as a Congressman representing one of the Great Lakes areas, I want to say how much I appreciate, and I suspect Mr. Karth, the gentleman from Minnesota would agree with me in saying how much we appreciate the emphasis early in your statement on the Great Lakes area and the important role that the Coast Guard plays there, and the crucial importance of somehow having more effective pollution prevention in our area.

Also, I want to complement you on your emphasis on the need for more effective weather prediction. Certainly we in our area of Ohio, with the July 4th tragedies so fresh in our minds, understand the emphasis you have placed there.

Early in your statement at some point here, you warned against precipitous decisions and on the top of page 5 you say ranking is essential in terms of national priorities for these various important functions.

Ranking by whom? Where are you suggesting that this decision should be made? I judge you are saying that this decision should be made before the reorganizational problem is attacked. Should this ranking of priorities begin right here in this committee? Is it in Congress this this decision should be made?

Mr. BEGGS. It is my view that that certainly is an appropriate function for the committee. In answer to your question of whether it should proceed before organization, that, too, is my view.

I think the program and the policy should precede the organization. I believe that the establishment of any new organization, or any assignment of additional responsibilities within an existing organization, should be preceded by a clear outlining of what the objectives are, and the priorities of the program.

My past experience in the marine resources area leads me to believe that the development of the coastal zone and the inland waters, the Great Lakes, rivers, the whole watershed areas, is of very high priority because we are proceeding down the line where we are destroying many of the environmental characteristics of those areas.

I served for a period on the National Resources Board of the State of Maryland and I was made very painfully aware of what we are doing to some parts of the Chesapeake Bay.

I am also aware by reason of business experience of the lack of attention to much of the fundamental research and, indeed, the technology

needed to understand better the interactions of the ocean environment and of the coastal zone and inland waters and the necessity to expand that body of knowledge. There have not been sufficient resources devoted to that in the past and there is some urgency in doing that.

Mr. MOSHER. Don't you think the Commission's report reflected that same urgency?

Mr. BEGGS. Yes, it did and I quite agree with that. I would suggest, however, that rather than create a large new agency with broad operational responsibilities, at least some consideration should be given to the creation of an agency more on the lines of NASA which, as you know, has spun off operational capabilities as they were developed to other agencies.

The general experience, I think, is that the pursuit of science and technology, both in the fundamental sense and the applied sense, has been carried out in organizations which did not have operational capability. That is reflected in the organization of most industrial firms where the great industrial research laboratories are deliberately separated from operating divisions of the companies.

It also reflects the experience we have had in the operation of our national laboratories, which have been kept divorced from operating responsibilities. It has also been reflected in the National Aeronautics and Space Administration.

I think that science and technology are best pursued in an environment where they do not have to worry about or are not concerned with day to day operational problems.

Mr. MOSHER. Now, the Commission report repeatedly emphasized the need for fundamental technological development in the uses of the oceans and, of course, for increased effort in the scientific interest there also. You are suggesting, I judge, that if a new agency is created, a new independent agency, NOAA, that the emphasis there should be almost completely on those aspects of the need we have, the need to take care of the present neglect of fundamental research and to expand scientific interests and the emphasis should be in that agency on those aspects, without its also having the job administering day-to-day operational activities. Is that what you are saying?

Mr. BEGGS. Yes, sir.

Mr. MOSHER. So you make a comparison with NASA, as you suggest NASA is a prototype to some extent in that respect.

Mr. BEGGS. In regard to the basic method of operations of the agency, yes, sir.

Mr. MOSHER. Of course, NOAA limited to those activities couldn't begin to have and there wouldn't be the need for it to have the budget that NASA has. It couldn't begin to have the "oomph" in terms of agency importance that NASA would have, so would it not be too small to really do the job unless it had these other operational activities attached to it, too?

Mr. BEGGS. As I read the Commission's report, it struck me that the increment above the existing budget levels of the organizations that they were absorbing was very small. It seemed to me that that was the area you really want to focus on, that is, the new activity that would be added by virtue of creating this new organization. By limiting the organization to the areas of science and technology, you would focus on that issue. While the agency created on that basis would be

relatively small, it would focus on the major problem, that is the development of a new initiative in science and the technology—the ability to create the instruments and the vehicles and the other tools that you need in carrying on the exploration and the pursuit of science in the oceans and the waters.

Mr. MOSHER. But even with that limited function, you would think that a separate agency would be best rather than to have that function added to NASA's responsibilities, or to the National Science Foundation's responsibilities, or to the Department of Transportation, or the Department of the Interior responsibility.

Mr. BEGGS. Well, sir, coming out of NASA myself I am prejudice in the direction of the Space Agency, but I think certainly that that should be considered. I think that should be considered as another alternative.

Mr. MOSHER. On page 9 it seems to me is the very essence of your testimony. You say, "I suggest, however, that the combination of scientific and operational programs in one agency may impair the effective administration of either activity. Experience indicates that the two do not mix well."

Do you want to cite what experience you are talking about there? Was that your experience in NASA, or are you looking in on ESSA perhaps? Are you suggesting that that is what has happened in ESSA, or is it your own experience thus far, or the Coast Guard experience at some point? Where is the experience that proved this, specifically?

Mr. BEGGS. I think it is difficult to prove this point conclusively. In making the statement, I am drawing on the experience I have had in industry, in NASA, and in general in the observation of the process of proceeding with scientific and technological kinds of programs.

Again, the experience with the large industrial organizations has been that the pursuit of the applied sciences and technology that they need for the future growth of the company is best performed in an independent industrial laboratory separated from the operational parts of the concern.

I refer to the Bell Telephone Laboratory which is probably the best known and perhaps the greatest of the industrial laboratories, but most large industrial organizations organize that way. The experience we have had with our national laboratories has been that they pursue the applied science and technology best when they are not assigned any operating responsibilities.

This has certainly been the experience in our space program. When we developed the communications systems satellites and the meteorological satellites, it was considered at one time as to who should operate them and it was decided that it would be best if they were spun off to an operating agency, in one case to a quasi-public-private kind of an organization and in the other case to ESSA.

It seems to me that, if an organization has broad operating responsibilities, of necessity those responsibilities tend to become the most important to it because they are pressing day after day. They, likewise, tend to come up with frequent crises and it is, I think a natural reaction to reach for those resources which are available to you and the use of which will not immediately endanger anything.

So there is a tendency to land on the research and development side at that point and to pull people out of research and technology and

move them into an operating problem in order to solve that problem, with the intent, of course, of putting them back once the problem is solved.

But this temptation exists constantly and if you do not have a very strong and vigorous research side management pushing hard all the time, there is a tendency to reduce the urgency and reduce the thrust of your research program.

That would concern me. That is why I think you will find that the organizations I referred to have restored to moving their research people away from or out of the direct operating line.

MR. MOSHER. Mr. Chairman, could I pursue this just a little further? I don't want to take too much time.

MR. LENNON. Oh, yes.

MR. MOSHER. I have heard it argued that the day-to-day operational responsibilities picked up by ESSA actually have suffered since creation of ESSA, have suffered to some extent because in the administration of ESSA there is too much interest in the scientific aspect. Now are you suggesting that there would be a similar fear, if the Coast Guard was moved into NOAA, that the top management interest in NOAA might be so oriented toward science and technology development that the day-to-day practical operations of the Coast Guard would suffer, the matter of buoy tending and that sort of thing? Is that your basic argument?

MR. BEGGS. I think that danger exists; yes, sir. It exists in my mind.

MR. MOSHER. Would you specifically cite ESSA as an example of this?

MR. BEGGS. I am not as familiar with the ESSA organization as I am with some of the others and I don't know what the experience in this regard has been. However, I think that this kind of a consequence, on emphasis on the scientific and engineering side can and does exist.

MR. MOSHER. Well, now, your statement very properly, I think, emphasized the primary and transcendent interest of the Coast Guard in functions that have to do with transportation, the day-to-day job that the Coast Guard is doing so well right now, and you seem to suggest that if it was moved into NOAA that these might suffer and the national interest might suffer because they would be separated from the integrated transportation interests that were conceived for the Department of Transportation.

However, the concept of NOAA that I assume the Stratton Commission had was that the Coast Guard has a potential in NOAA that goes way beyond its present day-to-day jobs; without hurting its present day-to-day jobs, the Coast Guard could be an augmented and expanded organization in the uses of the oceans, and that this could be done definitely without interfering with its transportation functions and its other present day-to-day functions.

I guess what we have to consider here in the committee are those two different concepts of the Coast Guard, whether to emphasize its present role or the concept of the Coast Guard as an expanded, more dynamic, more interesting, in a way, augmented organization.

Mr. Chairman, that is all.

MR. LENNON. Thank you, Mr. Mosher. Mr. Karth?

Mr. KARTH. Thank you, Mr. Chairman. I would like to pursue some of the questions that Mr Mosher hit upon.

Mr. Secretary, isn't it rather difficult to draw that fine line of separation between scientific research on the one hand and scientific development on the other; where does one end and where does the other one begin?

Mr. BEGGS. Yes, sir. It is.

Mr. KARTH. Isn't it true that NASA is for all practical purposes probably using 90-95 percent of their funds for scientific development?

Mr. BEGGS. I wouldn't quibble with the percentage, that certainly the vast preponderance of money is going into the development.

Mr. KARTH. Isn't it also true that the Department of Transportation, for example, has this dual responsibility, scientific research on the one hand, and the application of that scientific research to development, on the other?

Mr. BEGGS. In some respects yes, but for example, in aeronautics there was a consideration at some point in the history of the creation of the Department as to whether the mission for the pursuit of aeronautical sciences should be moved from NASA because of responsibilities in civil aeronautics, in civil transport. It was decided somewhere along the line, that this was not a good idea and so that responsibility remained in NASA.

There is a certain amount of applied science being pursued in the Department as well as a good deal of development work in trying to solve specific problems that we have in our operating side, air traffic control and so forth, but I think that is an outgrowth of the basic mission, rather than the converse.

That is, we don't do the work independently of the operating responsibility. It is in answer to a specific problem. We have also not created large laboratories in the Department to pursue these things.

As a general rule, we have made use of existing national laboratories by assigning specific programs to them, or have bought this service from industry.

Mr. KARTH. I can foresee though that the Department of transportation one day probably in the not too distant future, would want some laboratories of their own.

Mr. BEGGS. It is conceivable.

Mr. KARTH. Or jurisdiction over existing Government laboratories which probably don't meet the functional operation for which they were originally intended in other agencies, might better be transferred to the Department of Transportation later on because of your area of responsibility.

Do you say that that is a fair statement?

Mr. BEGGS. Yes, sir, but if it did happen, I think we would at that point consider the organizational relationship of those laboratories to the operating administrations and certainly give very serious consideration to putting those laboratories in a separate kind of an organization from any one of the operating administrations.

Mr. KARTH. And don't you think that the organization proposed by the Commission insofar as it relates to NOAA, pretty well fits into that same area?

Mr. BEGGS. Yes, it does, but I think there is a difference in degree

here on the amount and the thrust of the science program. We are building on a tremendous body of knowledge in transportation that has been, in many cases, pursued for years. Transportation technology in the rails has gone on for 150 years or more. Technology in aeronautics and civil aviation is now 70 years old, or so, and these programs are building on a body of knowledge that has existed for a long, long time.

The needs in the marine sciences, I think, are of a different magnitude. To be sure, this is not a new science. It is a very old one. Men have been studying the seas and the waters since the beginning of civilization.

Mr. KARTH. Unfortunately not enough progress has been made due to the confusion of responsibility which has existed. Do you agree with that?

Mr. BEGGS. I would certainly agree that not very much progress has been made because there has not been enough of a thrust here or in any country. I would also agree that the organizational aspects are a large part of that, although one would have supposed that there would have been a greater attention to this science in places like the United Kingdom and in some of the European countries than there was.

But organization certainly has a large part in that matter.

Mr. KARTH. Is there any doubt in your mind that if there would be certain technological breakthroughs in pollution abatement or pollution control in an NOAA type organization that that technological development would probably pass on to other agencies that have a greater existing responsibility in pollution abatement and pollution control?

Mr. BEGGS. No indeed. I think that the problem is so great that there would be immediate adoption by almost all agencies concerned with this problem including the Department of Transportation.

Mr. KARTH. Really what I am getting at is that like NASA to some degree, once a scientific research project has been successful in providing breakthroughs, that the applicability of that scientific research may well be passed on to other agencies of the Government agencies which have a more direct responsibility just like NASA today passes on to other agencies this technological breakthrough.

Mr. BEGGS. Yes. My reference here though is primarily related to some of the operating responsibilities that the Coast Guard now holds in such things as law enforcement, navigation, and search and rescue, which are intimately connected with the problems that we have in the same areas in the air.

Here it seems that you have operating responsibilities which not only are quite demanding and urgent in and of themselves, but there is also a great necessity that these be coordinated on a day-to-day basis with parts of the FAA, for example.

In fact, there is a very close working relationship here in all of the areas. Search and rescue, the navigation aids, and so forth, have to be put together in such a form that they provide a meaningful system. It seems to me that these kinds of operating responsibilities are best lodged in an executive department that is primarily concerned with this, in a broad way, across all modes of transportation. What the Commission is trying to address is how do you use human and finan-

cial resources in a way to expand knowledge and develop the technology and engineering programs that relate to the problems of the oceans and inland waters.

And I really don't see the connection between the operating responsibility that I previously mentioned and the expansion of this knowledge.

Mr. KARTH. Have you any evidence that this cooperation between the air and the sea in terms of safety and search and rescue is greater today than it was before the Coast Guard was in the Department of Transportation or for that matter, before the Department of Transportation existed?

Mr. BEGGS. Well, I think the evidence, of course, would have to be pulled out of the experience we have had in running rescue operations with the FAA and Coast Guard both participating. Certainly we have a communications system set up now in the Department where both of these administrations are working very closely together in reporting disasters and accidents and in working together in reacting to them.

That is a fact and I think that is more highly developed now than it was prior to the existence of the Department. In the area of accident prevention, I think there is a good exchange between the Coast Guard and the FAA and indeed, some of the other administrations in the kind of regulations that they are imposing, the kind of inspections that they perform in making this aspect of accident prevention more effective.

But the evidence you are asking for I suppose would have to relate to whether we have indeed reduced the accident rates in certain areas and I guess, regretfully, the rates have not gone down dramatically since the creation of the Department. They have not increased dramatically either for that matter.

Mr. KARTH. Or for that matter, rescue is not today more successful than it was 5 years ago.

Mr. BEGGS. I believe that is so. I might call on Admiral Trimble to comment on that. Admiral Trimble?

Admiral TRIMBLE. As the state of the knowledge increases, I think our techniques improve, Mr. Karth, but I can't cite specific experience to show that it is better or worse. We think that we are doing better today even though perhaps some of our equipment still is of the same vintage that we were using 5 years ago. That is gradually being replaced and, of course, with newer equipment it gives us a little better capability, communicationwise as well as range and as well as dealing with the ocean that we are working in.

Mr. KARTH. Yes, sir. I did not mean to imply that I was casting aspersions at the Department of Transportation. I think the success of your operation, sir, depends more upon the technological progress that is made than the immediate, almost instantaneous relationship of administrative responsibilities between the air and sea.

I have a strong feeling that that is probably a major factor if there is a significant change.

Mr. Chairman, I suppose I could pursue this for hours, but I have one last question. Throughout your paper, Mr. Secretary, you dealt almost, insofar as it relates to organization of NOAA, almost exclusively with the Coast Guard and its assignment to the Department of Transportation.

Is that the only objection you have to the recommendations of the Commission as it relates to organizational structure?

Mr. BEGGS. Of course, I was addressing myself to the organizational recommendations as they impacted and reflected on the Department of Transportation. I think an equal argument can be made on the Weather Bureau and the Coast and Geodetic Survey as to the separation of those organizations from where they reside right now, and of course, the same argument that I advanced on the mixture of operating responsibilities and science could be advanced.

Mr. KARTH. If your argument is thoroughly sound, shouldn't they also belong in the Department of Transportation?

Mr. BEGGS. It has been argued that the Department of Transportation which is the largest user, at least the largest user in the civilian side of Government, of the Weather Bureau services, should properly contain the Weather Bureau. I am not sure whether I fully subscribe to that argument or not.

I haven't studied it in great detail, but that argument has been advanced and I think it has some merit. The Department does use great quantities of the output of the Weather Bureau. It also is the chief beneficiary of and interacts probably in the major degree with the Coast and Geodetic Survey since we rely on their charting service.

Mr. KARTH. You find no difficulty in exchanging information and cooperating and coordinating your activities irrespective of the fact that it is not under your jurisdiction, do you?

Mr. BEGGS. Nothing of great consequence.

Mr. KARTH. That is all, Mr. Chairman.

Mr. LENNON. Mr. Schadeberg?

Mr. SCHADEBERG. Mr. Chairman, the answers that have been given to Mr. Karth's questions in his final questioning have answered many of the questions I was going to ask. Would it be feasible, Mr. Secretary to divide the responsibilities of the Coast Guard in a sense between NOAA and the Department of Transportation so that the matters of the Coast Guard related to transportation would be in the Department of Transportation and the other matters would be in another agency?

Mr. BEGGS. I suppose that could be done. I would suggest that there are some problems involved in doing that, because the matters directly related to oceanography are sometimes pretty well inextricably mixed with the other missions of the Coast Guard.

For example, much of the research in science that we pursue in the polar regions is related to the mission the Coast Guard performs in the polar regions, in reporting of icebergs and breaking ice. The same is true in many of the oceanographic activities. Most of our cutters carry with them oceanographic instruments, but I suppose that even here they could supply this service to the new agency as a service from the Department of Transportation to a NOAA.

But I think there are management advantages to having them together. Rather than pursuing it that way, I would suggest that the Coast Guard could very well operate a fleet of oceanographic types of vessels for a NOAA and supply that service to them.

Mr. SCHADEBERG. Then what it really boils down to be is whether or not the proposed NOAA would spin off the matters of transportation to the Department of Transportation or whether the Transporta-

tion Department should have the Coast Guard spin off the other matters into another agency.

Mr. BEGGS. I might again ask Admiral Trimble, who is more intimately connected with this than I, to comment.

Admiral TRIMBLE. The Coast Guard is made up of a number of agencies. This is the history of our formation. In the field of aids to navigation, light stations were located on the coast close to our rescue stations, our ships were working near lights, the Bureau of Lighthouses had tenders working near their lights and near our stations; it was seen that there would be some advantage in having one agency operate both of these services to the public.

As a multimission agency, if you will, we have resources for our principal missions. Now, our principal missions that we identify primarily support marine transportation. For instance, in aids to navigation, we have tenders. In the Great Lakes these tenders are located to take care of the aids to navigation and yet we do find that during the season that they are able to operate outside of ice areas, they can also carry scientists and we perform innumerable oceanographic projects for universities and for other agencies.

In the same manner the icebreaker *Mackinaw* serves a dual purpose. So that it is the multiuse of our facilities, we think, that makes the Coast Guard a more effective organization. Were you to try to separate our functions—take our polar operation with icebreakers. We have these for the support of transportation, to help commercial ships get through to some of our military bases and support some of the other missions. While there, they have time on their hands, between the support missions to transport and carry scientists and do oceanographic work. I think in last year's evaluation of our polar operations, the days used for navigation support and for scientific support were about half to half. Yet we have the icebreakers for marine transportation support. It would be somewhat difficult to have an effective organization were you to try to draw a line down the middle.

Take our ocean weather station operation. We consider these ships principally support transportation. The environmental data they collect, up to 100,000 feet, goes into the prediction system to assist transoceanic air flights. While the ships are on station, they take almost continuous oceanographic readings that go to various agencies that have requirements for this data. While we have the ships for one purpose, they can also be utilized almost at the same time, and I might say very effectively, for gathering oceanographic data. The same ships are used for search and rescue and in Vietnam for coastal surveillance.

Mr. KARTH. Will the gentleman yield for one question?

Mr. SCHADEBERG. Yes.

Mr. KARTH. Where in your personal opinion, Admiral, notwithstanding the fact that your boss is sitting on your left, do you think the Coast Guard would best serve its total purpose, in a new organization such as suggested by the Commission referred to as NOAA or in DOT?

Admiral TRIMBLE. In my reply to Mr. Schadeberg I pointed out the difficulty of dividing our polar icebreaker operations between transportation and marine science. While our operations are transportation oriented primarily, they do take place in the ocean environment and can broadly be described as "marine science." The fact remains that we

are in the Department of Transportation and I think an effective arm as far as marine transportation safety is concerned. We are properly placed in that department.

Were there to be an agency dealing with the oceans solely and the Coast Guard were put in it, I am confident that the Coast Guard could perform effectively under that agency.

Mr. KARTH. I must say that was an unfair question, considering the circumstances.

Mr. SCHADEBERG. Some of us at least informally have been thinking that probably the Coast Guard activities are so varied and so important that it ought to be a separate agency by itself, not having its various responsibilities spun off to other agencies that are taking part in some of their activity.

That is all. Thank you.

Mr. LENNON. Will the gentleman yield to me at that point?

Mr. SCHADEBERG. Yes, sir; surely.

Mr. LENNON. Admiral Trimble, I think the question in your mind and the question in the mind of those in the Coast Guard is the administrative policy of such a new Government structure with respect to the day-to-day operations of the Coast Guard.

If the administrator or the chief executive of such an agency were oriented toward the science primarily, I can see how the Coast Guard could be affected in its day-to-day operations based on priority of funding when they went to the Bureau of the Budget. I am talking about this new separate agency, what would an administrator or director relay to the Bureau of the Budget in priorities and what effect it might have on the day-to-day operations of the Coast Guard.

Would you care to comment on that?

Admiral TRIMBLE. Mr. Lennon, I share the concern that Mr. Beggs has expressed in trying to mix day-to-day operations with the scientific side of such an agency. I am sure that much would depend upon the particular capability of the administrator and it could go either way.

It could be a balanced program. But to cite one example, once the Stratton Commission report was publicized, I think there was a feeling in the trade, in the industry, that "Look at all this money that could be made available if this consolidation took place toward the scientific endeavors that were recommended in the Commission's report." Yet, as Mr. Beggs has mentioned, the dollar figures that would be consolidated are for the day-to-day missions of the existing agencies and unless there is a definite change in mission assignment, there wouldn't be really any additional money that would be available for the traditional endeavors that the Stratton Commission recommended.

So right off there was a sort of public misinterpretation of the proposals. This alarms us, the fact that there was a thought that this money could be converted to the oceans right off. This is one reason why the Coast Guard has this concern.

Mr. LENNON. We are delighted to welcome to the Subcommittee on Oceanography another distinguished Floridian. Mr. Frey we recognize you.

Mr. FREY. Thank you, Mr. Lennon. I just learned this morning of appointment to this illustrious committee and I am very happy to join the chairman and my colleagues and especially my colleague from

Florida, Mr. Rogers, who has done so much for oceanography in Florida and throughout the country.

I think I had better read all the testimony in the past so that I am not repeating anything and hope in the future I will be able to participate and help the subcommittee.

Mr. LENNON. I am delighted that the gentleman attended this morning on the first day of his appointment, and I hope he sets that good example for the other members of the subcommittee.

I now recognize the long-time distinguished Floridian, Mr. Rogers.

Mr. ROGERS. Thank you, Mr. Chairman. I am delighted to welcome my colleague from Florida. We are delighted to have him here and I know his contribution will help in this field.

Mr. Secretary, I am delighted to see you and Admiral Trimble. I am not sure that I follow your argument that the Department of Transportation, however, is simply a program that carries out operations. In my view and in my thinking it does a great deal of research and scientific work, does it not?

Mr. BEGGS. Yes, sir. I did not mean to imply that we are simply involved in operations. We are involved in a great many research programs. In the highway program, as you know, we disburse several hundred million dollars which is directed toward the pursuit of applied research and technology to try to improve the safety of the highways and to try to improve the efficiency of those highways.

We are also involved in a great number of safety research programs throughout the Department directed toward improving the safety of all modes of transportation and we are pursuing research programs of quite a broad array in looking at new forms of transportation, particularly as related to the intermodal aspects and urban transportation.

Mr. ROGERS. As a matter of fact, in the roadbuilding, you don't get out and actually build the road; do you?

Mr. BEGGS. Of course, not at all.

Mr. ROGERS. You simply make grants of money and try to coordinate some planning. You are not even as operational there as much as the Coast Guard in putting out its markers?

Mr. BEGGS. No, sir. I would suggest that we do more than disburse grants and coordinate in the highway program. We do a great deal of highway engineering and setting of standards on the roads.

Mr. ROGERS. Research?

Mr. BEGGS. We work mostly with the States in the planning and design of the highways.

Mr. ROGERS. This is what we wanted to get into in the oceans too. You don't have ICC under your jurisdiction; do you?

Mr. BEGGS. No, sir.

Mr. ROGERS. That handles the railroads, trucks, surface transportation. Do you have the Maritime Commission, MarAd, under your jurisdiction?

Mr. BEGGS. No, sir. We do not.

Mr. ROGERS. These handle all the shipping on the water. Do you have CAB under your jurisdiction?

Mr. BEGGS. No, sir. We do not.

Mr. ROGERS. I am not sure then that your logic necessarily follows in the argument that you have made against transferring the Coast Guard. I don't think that necessarily follows. I understand why you

are making it and I think you have done it very effectively. I just happen to disagree with your reasoning and conclusion.

Now, what we are trying to do and what we want to do is to put emphasis on the development of the seas which we have not had sufficiently as a national effort in this Nation. This is what we want to do, and what we are looking at is some organization to do that.

Now, your Department was set up, as I recall, by governmental reorganization plan; was it not? Was it also under an act?

Mr. BEGGS. It is under an act; yes, sir.

Mr. ROGERS. Proposed by the last administration?

Mr. BEGGS. That is right.

Mr. ROGERS. And I think Admiral Trimble worked on the task force in getting it organized and did a very good job. Now, the thrust of that was to try to emphasize transportation and yet we didn't put all of the operating agencies as such under your jurisdiction. What we want to do now is to emphasize the development of resources of the sea.

Now, we may put maritime functions under this agency, such as the ships that use the waters. Wouldn't it be logical then to have Coast Guard, which has the responsibility of the safety of those ships, the commerce of the Nation, in other words, I think you can use this argument anyway you want to make it, as to saying what you put together. But I think what we want to get across is that we want emphasis placed in the development of this area, and the Coast Guard, we think, is a logical constituent agency to be a part of this.

A study made by a presidential commission thought so too, so that this is not just drummed up as a way to get a change brought about. It is for a purpose. Now, we anticipate that each Department that would be affected by having one of its constituent agencies removed into a new agency would normally oppose this. I would bet two to one Interior would oppose our changes and we expect to hear from them and we would expect them to oppose it.

This is a normal function of Government to try to keep what is in one's department and I know this is your job too. We do appreciate your testimony and your thinking and we will categorize it as coming from a department that has an agency that it does not want to lose. On that basis then, I think that this committee can make a judgment on how we should develop this independent agency to really put a focus on the development of the seas.

But I think you have stated your Department's views very well and very concisely. Thank you. Thank you, Mr. Chairman.

Mr. LENNON. I will recognize the gentleman from Wisconsin, Mr. Schadeberg.

Mr. SCHADEBERG. Mr. Chairman, if not for the formal record but for my own information, I wonder if it is possible for the Coast Guard and for the Department of Transportation to provide a brief definition of the specific primary and secondary missions and responsibilities if possible.

Mr. BEGGS. Yes, sir.

Mr. SCHADEBERG. Is it right to have it in the record?

Mr. LENNON. Yes. I ask unanimous consent that there be provided for the record by the Department of Transportation, to be jointly signed with either Admiral Trimble or Admiral Smith or his designee, a letter setting forth in specifics and definitive terms the answer to the

question of the gentleman from Wisconsin. You gentlemen don't object to that, do you?

Mr. BEGGS. No, sir.

(The letter follows:)

THE SECRETARY OF TRANSPORTATION,
Washington, D.C., October 22, 1969.

HON. ALTON A. LENNON,
Chairman, Subcommittee on Oceanography,
House of Representatives,
Washington, D.C.

DEAR MR. CHAIRMAN: We submit the following information for the record of the September 18, 1969 hearings of the Subcommittee on Oceanography of the House Merchant Marine and Fisheries Committee on H.R. 13247 and *Our Nation and the Sea*.

Mr. Schadeberg asked for a definition of the primary and secondary missions and responsibilities of the Department of Transportation and the U.S. Coast Guard. Within DOT and the Coast Guard it is extremely difficult to clearly differentiate between primary and secondary duties. However, the missions and responsibilities of the Department of Transportation are set forth in the Department of Transportation Act as follows:

(a) To assure the coordinated, effective administration of the transportation programs of the Federal Government;

(b) To facilitate the development and improvement of coordinated transportation service, to be provided by private enterprise to the greatest extent feasible;

(c) To encourage cooperation of Federal, State and local governments, carriers, labor, and other interested persons toward achieving national transportation objectives;

(d) To stimulate technological advance in transportation;

(e) To provide general leadership in identifying and solving transportation problems; and

(f) To develop, and recommend to the President and Congress for approval, national transportation policies and programs to accomplish these objectives with full and appropriate consideration of the needs of the public, users, carriers, industry, labor and the national defense.

The primary duties of the Coast Guard are set forth in 14 USC 2 which can be summarized as follows:

(a) To enforce or assist in the enforcement of all applicable Federal laws upon the high seas and waters subject to the jurisdiction of the United States;

(b) To administer laws and promulgate and enforce regulations for the promotion of safety of life and property on the high seas and on the waters subject to the jurisdiction of the United States covering all matters not specifically delegated by law to some other executive department;

(c) To develop, establish, maintain, and operate, with due regard to the requirements of national defense, aids to maritime navigation, icebreaking facilities, and rescue facilities for the promotion of safety on and over the high seas and waters subject to the jurisdiction of the United States;

(d) To engage in oceanographic research on the high seas and in waters subject to the jurisdiction of the United States; and

(e) To maintain a state of readiness to function as a specialized service in the Navy in time of war.

Coast Guard secondary responsibilities may be categorized as those duties involved in cooperation with other agencies. These responsibilities are outlined in Chapter 7, Title 14 U.S. Code. Included is a general statement of cooperative responsibilities, Section 141(a):

(a) The Coast Guard may, when so requested by proper authority, utilize its personnel and facilities to assist any Federal agency, State, Territory, possession, or political subdivision thereof, or the District of Columbia, to perform any activity for which such personnel and facilities are especially qualified.

This section is followed by detailed expositions of cooperation allowed with the Departments of State, Treasury, Army, Air Force, Navy, Post Office, Commerce and as assigned to assist foreign governments. However, even these responsibili-

ties are interfaced with the basic missions of the Coast Guard and cannot be completely divorced from the primary missions.

Sincerely,

JOHN A. VOLPE.
P. E. TRIMBLE,
Vice Admiral, U.S. Coast Guard,
Acting Commandant.

Mr. LENNON. You mentioned the Bureau of Public Roads. The Bureau of Public Roads is under the Department of Transportation?

Mr. BEGGS. Yes, sir.

Mr. LENNON. I am saying this to illustrate that there are some changes in view. Who is the director of the Bureau of Public Roads?

Mr. BEGGS. Mr. Ralph Bartelsmeyer is. Mr. Francis Turner is the Administrator of the Federal Highway Administration.

Mr. LENNON. That is under the Department of Transportation is it not?

Mr. BEGGS. Yes, sir.

Mr. LENNON. He was for how long the chief engineer of the Bureau of Public Roads, before he took the position that you now designated him as having?

Mr. BEGGS. Mr. Turner? For a large number of years.

Mr. LENNON. Thirty-two years?

Mr. BEGGS. Yes, sir. I was going to say 30.

Mr. LENNON. Under the new administration he is now what?

Mr. BEGGS. Administrator of the Federal Highway Administration to which the Bureau of Public Roads reports.

Mr. LENNON. Just about this time last year in a public speech he denounced in strong terms the action of one of the subcommittees on public works concerning legislation that would authorize trucks of substantial, and I repeat substantial, additional weight, wider trucks and and longer trucks, and it concerned me because I believe he was right.

I believe he was in a position from his long experience as the chief engineer of the Bureau of Public Roads for some 32 years. So I sat down and wrote him a letter asking would he recapitulate exactly what he said as he was quoted in the press. He sent it to me. I used it, I think rather effectively in some places.

Now, much to my surprise in the last 2½ weeks in his new capacity, in his elevated capacity he appears before the same subcommittee on public works and recants and says, "Whatever the Congress wants to do we will agree." So you see how people do change. I wonder why. You know what I am talking about.

Mr. BEGGS. I know what you are talking about; yes, sir, although I think he did qualify his statement.

Mr. LENNON. He qualified it by saying, "But give us time, go ahead and pass the law, authorize extended length of trucks, authorize a substantial additional weight and additional width, but give us until 1970 to test the bridges as to whether or not they will stand this additional weight," which last year he categorically and emphatically said they couldn't stand.

You go back and read the record.

Now, let's talk about the Coast Guard a little, Mr. Secretary.

What is the basis for the Coast Guard being under the Department of Transportation? It is related to transportation?

Mr. BEGGS. That is correct.

Mr. LENNON. And essentially in its mission and role of transportation it is primarily related to what, the maritime industry, right, the maritime?

Mr. BEGGS. Well, it is related to the maritime, of course.

Mr. LENNON. In its relationship to transportation?

Mr. BEGGS. Yes, sir; but also I would add that in the area of navigation and some of the aspects of regulation, it is of course concerned with the intermodal kind of problem between the maritime industry and the rail industry and the trucking industry, and so forth. I am thinking now of such things as the container aspects of transportation.

Mr. LENNON. When we speak in containers related to the Coast Guard we are speaking in terms of container ships on the seas and in the navigable waters; are we not?

Mr. BEGGS. That is correct.

Mr. LENNON. Now, isn't it rather strange that you have the Coast Guard in the Department of Transportation primarily because of its relationship to maritime transportation and yet you have the Maritime Administration in another department of the Federal Government, don't you, to wit, the Department of Commerce. Now, are you here saying that the Maritime Administration ought to be in the Department of Transportation because it is essentially related, is it not, so you said, to your carriers across the country, both truck and rail?

Mr. BEGGS. I think logic says that the Maritime Administration should be closely associated with the rest of the transportation.

Mr. LENNON. Should it be in the Department of Transportation?

Mr. BEGGS. I believe so; yes, sir.

Mr. LENNON. What is the position of Secretary Volpe?

Mr. BEGGS. I think the Secretary has made statements, public statements, in which he has said that he feels here again that the definition and the study of the program and the policy in the maritime area should precede the organization and that he intends to participate in the development of that maritime program and policy, and indeed, the Department has been participating in that.

Mr. LENNON. Now, Mr. Secretary, let's suppose that in the late fifties there were 11 Government agencies or departments or agencies in that order, which as part of their historical roles and missions were involved, all of them, in space. Do you think that if that were true that you would have reached the phenomenon of placing a man on the moon unless you brought those Federal agencies together in one Government structure. Do you believe that with your experience with NASA??

Mr. BEGGS. I think certainly the focus would have had to have been in a single department. There is no question about that. I would again question, if this had been 11 executive agencies involved, how much of that should have been brought together, however.

Mr. LENNON. But the difference in that and what we are talking about here is that other than in DOD and only to a relative degree in DOD did you have a single agency of the Federal Government that was involved in the potential of space exploration; didn't you?

Mr. BEGGS. That is correct.

Mr. LENNON. So we have a different situation. We have these agencies and departments of the Federal Government and human nature is the same all over the world, "don't affect me." Yet they have been

involved in the various facets of marine science. Hasn't the time come now at last and can we turn our backs on this Commission report. Has there ever been a more responsible, knowledgeable, dedicated commission which has given the time that this Commission has in making its recommendations to the executive branch of the Government and to the Congress with respect to the direction we ought to go? What are your alternatives?

You suggest and it was suggested here yesterday that perhaps one of the alternatives would be that we would take the same agencies that were suggested to go into NOAA and put them in an existing department. Off the top of your head, in which department would suggest that they all be put? Would you like to have the Bureau of Commercial Fisheries? Would you like to have certain facets of the Fish and Wildlife now in the Department of the Interior? Would you like to have ESSA out of the Department of Commerce in the Department of Transportation? These are traumatic things. We are all human and react, "Don't take anything from me." That is what we have to resolve.

We have to make up our minds. I appreciate that the administration can't make a rash recommendation or judgment, but I repeat what I said earlier when I said that we are all disappointed that the administration has not given a little more priority at least in coming forward a little more definitively with alternatives if it cannot buy the Commission report.

I would not have you understand as a member, a representative of the new administration that there is any partisan politics in this at all. I think you know that last year, as soon as the election was over, the distinguished gentleman, Mr. Mosher, the ranking Republican member on this committee, and I conferred with respect to trying to maintain the continuity of the National Science Council. We recommended to the President that he continue Dr. Wenk in this job to give the new Marine Science Council an opportunity to continue because they were all new people, as you know.

We are all a little disappointed, and I think that view is shared almost in unanimity on this subcommittee with respect to you coming in and saying, "This we recommend and this we disapprove."

It is going to be a difficult time. I remind you, sir; that Dr. Wenk in his statement yesterday speaking for the administration, and I certainly think he speaks for the administration, listed all the accomplishments of the Marine Science Council. I had to agree, but I had to remind him at the same time that when the Marine Science Council came into being through legislative enactment by this Congress, the executive opposed the creation of a Marine Science Council, and I am talking about the former administration.

They just didn't see the need or the justification or the ultimate accomplishment, but we did, and it turned out that we were right.

We want your help. We want the administration to get into this thing, and we want you to do more than just suggest that there are alternatives. Definitively we want to know what the alternatives are. We are going to vote for bringing out of this subcommittee and the full committee and putting before the House sometime in the year, some legislation, and we hope that it will meet consensus on the part of the administration.

We would rather be in agreement. I have a lot of faith in this Commission. I am sure that the Commission considered these alternatives even though they didn't go into this Commission report. If they did, we couldn't have got it into this room, if it contained the exploration of the alternatives printed in the report.

I have absolute faith that they did explore the suggested alternatives in every one of these areas that have been enumerated in your statement and in Dr. Wenk's statement. Unless you folks can come up with something a little more than wait-see. We just can't wait-see. We have been waiting for 10 years in this field, and we did what we did 2½ years ago, almost three now, in creating a commission and council and we didn't get the administration support for that, but we just hammered it out and got it in there and it has been a great thing, particularly the Council, and I think the Commission too.

If we wait until next year, as suggested by the Ash Committee or Commission, we are just going through this thing again. I am not lecturing. I am just talking to you because we are all interested in this thing. You take the change in the attitude over in the Department of the Interior since this Commission report came out. They are moving.

I know why they are moving. Because they have sent a number of their distinguished folks to see me. They want not only to keep what they have, but they want some of these other things like maybe even the Coast Guard. So I understand that.

Wouldn't it be helpful if the agencies that are involved in this thing would sit down at a high level and hammer out something and come up here and say, "That is what we want to do." I have a lot of questions here that I wanted to ask you and counsel has some questions at this time. I may come back to mine if we have time. Counsel.

Mr. CLINGAN. I have one or two questions, Mr. Chairman. Thank you.

Mr. Secretary, if I understand the general thrust of your testimony today, it is that science and technology should be separated from operations. In Mr. Volpe's letter of March 10 to the Vice President he also expressed the fear that science and technology would be merged into the operating functions.

I would like to ask you to comment if you would upon what has happened within the Department of Transportation, to the national data buoy project? Has that been somehow submerged by operating demands over the last couple of years?

Mr. BEGGS. That is not my understanding. This was first proposed as a program about 2 years ago. In the assignment of priorities there were no appropriations made to that program. It has been proposed again, at a low level to be sure, in the 1970 budget. I have devoted a great deal of attention to the national buoy data program myself and we are seeking ways to get a little more money into the program, because that is what it needs.

It needs some financial resources in order to get it to a point where we can actively talk about an operating system.

Mr. CLINGAN. That is exactly the point that I wanted you to make, Mr. Secretary. Here we had a project in which the Coast Guard is not only designated as lead agency by the National Council, which suggests its importance, but it has been named as a national project, one of very few. After considerable study it was named, designated a national

project by the Commission and yet within the Department it received a very low order of priority. It seems to me that this is what the members here are trying to emphasize, that if we do have these national science projects and they can't be gotten off the ground within the agencies, doesn't it seem that we need something new that can get them off the ground?

Mr. BEGGS. We think we can get this one off the ground. It does not have a low order of priority insofar as the Department itself is concerned.

Mr. CLINGAN. As I understand it the Coast Guard requested funds under the previous administration for a new oceanographic ship to replace the Coast Guard cutter *Evergreen* and this request has been taken from the budget. Have there been any new efforts by the Department to replace those funds?

Mr. BEGGS. The problem with a new oceanographic cutter is one that concerns me a great deal. Early this year the Coast Guard took another look at the costs of building the ships that they would like to build and found that the cost level had escalated to a point where, instead of being able to contract for three ships within the amounts of money that we had requested, we couldn't get but two.

In other words, the costs of a new oceanographic ship had gone up so far, and the costs of the other ships had gone up as well, that you just couldn't buy it. So we asked for reprogramming of that money. I think this is related more to the problem that exists in the industry today and the inflationary trend that has been present in his part of the industry as well as most of the others. It has caused us to reprogram that money and look forward to another time.

Part of that money, part of that reprogramed money, is going to go into the national data buoy system, at least we are requesting that it go in to supplement the data buoy program.

Admiral Trimble might have a little more information that he would like to add.

Admiral TRIMBLE. Well, I think the information Mr. Beggs has given is substantially correct. There was another incident that precipitated our reprogramming proposals which I might say that the Department of Transportation fully supported.

The incident was a fire on the *Evergreen*. We had planned when we built the oceanographic ship which was to replace the *Evergreen* in approximately 3 years, to retire the *Evergreen* from the international ice patrol and the oceanographic functions she was performing. This past spring she had a serious fire on board and the extent of damage was over a half million dollars. So at this point, in addition to the rising costs that we had to face in our construction program and the need for funds to support the national data buoy program, we felt that it would be better considering the various possibilities and priorities confronting us, to apply the funds to repairing the *Evergreen* and continue to use her for the foreseeable future.

This was a painful decision. It was a Coast Guard one which was supported by the Department of Transportation. Now we are going on with our cutter construction program through the use of these funds; these cutters also perform heavily in the oceanographic area. They are used for ocean station duty and they are heavily instrumented

for oceanographic purposes. So this was a compromise that the Coast Guard reached considering its various programs.

Mr. CLINGAN. Thank you. I certainly wasn't criticizing your operational decisions. I was simply asking the questions to illustrate that you had priorities within the Department with regard to these science capabilities and that compared to other functions of the Department, you have felt that they would have to yield.

Mr. BEGGS. And I am afraid that under the budgetary pressures we are under in this country that there is going to have to be some future adjustment as well, because the Coast Guard fleet is getting very old indeed, and those ships are going to have to be replaced by whichever agency has the Coast Guard under its jurisdiction.

The average age of the Coast Guard fleet is almost 25 years and this is at the point where you have to consider replacing the entire fleet and that is a major expenditure.

Mr. CLINGAN. I have one additional question, Mr. Chairman.

Mr. Schadeberg asked you about dividing up the functions of the Coast Guard, and I think you mentioned management advantages of keeping those functions together. This is the point that the Commission was trying to make when they made their recommendations with regard to NOAA.

My question is, if you had to choose between fractionating the Coast Guard or transferring to another agency, which would you prefer?

Mr. BEGGS. If that hard choice had to be made, I would prefer to see those functions that are related to transportation remain with the Department of Transportation and spin off the research and development activities to the new agency.

That would be my personal choice, because I feel strongly that the transportation resources are needed in the Department of Transportation.

Mr. KARTH. Would counsel yield?

Mr. CLINGAN. Certainly.

Mr. KARTH. In other words, in that particular area, you and the admiral are at odds?

Mr. BEGGS. I think the admiral would prefer to hold the whole organization together. I will let him speak for himself.

Mr. KARTH. He said that before. Counsel and Mr. Chairman, let me just say this. I have a great deal of respect for Mr. Beggs. I knew him when he was in the National Aeronautics and Space Administration. I have a great deal of respect for that agency in spite of my repeated oversight investigations, Mr. Chairman.

But I want to say for the record that there is no question in my mind but that NASA would never have been as successful as it has been, had it not had the dual responsibility of research and development and, had one agency of Government done the research on the planetary, the interplanetary program, the lunar programs, all the scientific programs related to either one of those three, the communications program, meteorological programs and another agency had the responsibility for the development of them, I doubt seriously that any of those programs would have been nearly so successful as they have been under NASA.

I think evidence is replete with that. As a matter of fact and I think it has been well established. I just want that in the record. I disagree

strongly with those who suggest that we have to separate the research on the one hand from the development on the other.

Mr. BEGGS. Mr. Karth, if I may, Mr. Chairman.

Mr. LENNON. Go ahead.

Mr. BEGGS. So that the record may be complete, I agree completely with that. I don't disagree with that. My reference to operating responsibilities earlier was really what I described as the kind of things that the Coast Guard does day by day in aid to navigation and maintaining the buoy system, the light system, the search and rescue operations, and this kind of thing.

But I agree completely with you.

Mr. KARTH. But in almost every area of the Coast Guard if you don't mind my saying so, Admiral, I think that we have to do substantial research and new development. I'm certain it is not your fault because you have aggressively sought, I'm sure, to better develop the Coast Guard, but in almost every area of your responsibility, I think we have been laggards in doing the kind of new research and applying that research into new development, and I would suggest, sir, that if all of these questions were brought to bear under one agency and that agency had the responsibility for developing marine sciences and resources along with the responsibilities of the Coast Guard, I think a much better job would be done.

Mr. LENNON. I thank the gentleman for his statement and I think the Secretary knows that there are a number of distinguished members of the Science and Astronautics Committee who are members of this subcommittee, and those others who were not here today who are on that committee, have frequently in previous hearings expressed in substance what the gentleman from Minnesota has so articulately expressed here today.

You say on page 6 that the proposal to move from the Department of Transportation the Coast Guard to a new agency "undermines the objectives of Congress in enacting the Department of Transportation Act."

Specifically, I can tell you why most of the Members of Congress voted to take it out of the Treasury Department and yet you talk about the traumatic effect of moving 43,000 military and civilian personnel out of the Department of Transportation, the traumatic effect it would have on the Department of Transportation.

Let's think about the traumatic effect it had when we moved it out of the Department of the Treasury. I had good reason to be on the other side, for this committee felt that over the years the Coast Guard had just not been able to get the funding that was essential for its historic roles and missions which were increasing all the time.

That is the reason it came out of the Department of the Treasury. Now, I believe it has done better in the Department of Transportation. I think it might even do better as the lead agency in a new Government agency. That is frankly my opinion.

How many oceanography vessels are there, Admiral Trimble, under the jurisdiction of the Coast Guard?

Admiral TRIMBLE. Mr. Lennon, we have only two vessels that are completely dedicated to oceanography. One is the *Rockaway* and the other is the *Evergreen*, two that are completely dedicated.

Mr. LENNON. But you have other vessels, medium-endurance cutters and some of your high-endurance cutters, constructed to have some capability in oceanography?

Admiral TRIMBLE. All of our high-endurance vessels—33—even those in Vietnam, are configured and instrumented for oceanographic duties and, in addition, all of our icebreakers do oceanographic work; many of our tenders, though not instrumented, are utilized and used on a space available basis to perform oceanographic work; and our offshore platforms, many of them are instrumented to collect data in this field.

Mr. LENNON. In your dialog with ESSA on a day-to-day basis, do you know how many oceanographic vessels are operating under ESSA?

Admiral TRIMBLE. I am not sure how many are operating now although we have a very close association with ESSA; they have, I would say, about 10 vessels.

Mr. LENNON. How about the Department of the Interior?

Admiral TRIMBLE. The Department of the Interior has a number of vessels working in projects of the Bureau of Commercial Fisheries; smaller vessels, but they have quite a substantial fleet of these small vessels. It probably is as many as 20 or 25.

Mr. LENNON. The Coast and Geodetic Survey vessels are under what Department?

Admiral TRIMBLE. Under ESSA, which is under the Department of Commerce.

Mr. LENNON. I want to announce that the committee will resume its hearings on next Tuesday, September 23, at 10 a.m., in this meeting room. Our witness that day will be Dr. Myron Tribus, Assistant Secretary of Commerce for Science and Technology. He will be accompanied at that time by an old friend of the committee, Dr. Robert M. White, Administrator of ESSA.

Gentlemen, we appreciate your attendance and we hope that when we call you in the future to come back and answer specific questions you will find time to do so. We appreciate very much your cooperation.

Mr. BEGGS. Yes, sir, Mr. Chairman. Thank you.

(Whereupon, at 12:10 p.m., the subcommittee recessed, to reconvene at 10 a.m., Tuesday, September 23, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

TUESDAY, SEPTEMBER 23, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:15 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The subcommittee will resume its hearings this morning.

We are delighted to have as our two principal witnesses Dr. Myron Tribus, Assistant Secretary of Commerce for Science and Technology, and an old friend, Dr. Robert M. White, the Administrator of the Environmental Science Services Administration.

Is it your desire, Mr. Secretary, to use your statement as you furnished it to the committee?

STATEMENTS OF DR. MYRON TRIBUS, ASSISTANT SECRETARY OF COMMERCE FOR SCIENCE AND TECHNOLOGY; AND DR. ROBERT M. WHITE, ADMINISTRATOR, ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION; ACCOMPANIED BY ROBERT ELLERT, ASSISTANT GENERAL COUNSEL, DEPARTMENT OF COMMERCE

Dr. TRIBUS. Yes, sir, it is.

Mr. LENNON. All right, sir. If you will just proceed, sir.

Dr. TRIBUS. I would like to say in the beginning, sir, that there are about 1,100 pages in the report that we are discussing, not to mention the number of pages of documents that ought to be read in order to make sense from the report and see the perspective.

While I have been reading most of it and have studied some of it very intensively, I shall not pretend that I know every item that is in the report. But my staff has studied it very seriously, and I have brought with me a number of people who are responsible for studying it in detail and who have been briefing me and with whom I have been talking and to whom I would like to be able to turn for assistance when you ask questions.

Mr. LENNON. Mr. Secretary, if that occasion arises, just have the particular individual identify himself both by name and position.

Dr. TRIBUS. I thought I would just mention them now so that you can have an idea of who is here.

Mr. John Mirabito is a program analyst in the Marine Science Services Division of the Environmental Science Services Administration

(ESSA); Rear Admiral Jones, who is the Director of the Coast and Geodetic Survey of ESSA; Edgar L. Newhouse, who is staff liaison for marine affairs in the Department of Commerce; Marvin Pitkin, who is the Assistant Administrator for Research and Development in the Maritime Administration (MarAd) in the Department of Commerce; and Mr. Frank Kesterman, who is also in MarAd.

With me on my right is Mr. Robert Ellert of the General Counsel's Office in the Department of Commerce, and on my left is Dr. White, who is the Administrator of ESSA.

I am very pleased to be here this morning to present the Department of Commerce's views on "Our Nation and the Sea," the final report of the Commission on Marine Sciences, Engineering, and Resources, and on H.R. 13247 a bill to amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration, and utilization with respect to our marine and atmospheric environment.

Our Nation and the sea does a superb job of focusing national attention on the marine environment. One important thread interwoven throughout this report and the objectives stated in H.R. 13247 is that the Nation's economic development of ocean resources is contingent and dependent on science and technology. In this respect the Commission points out that a "solid base of science and technology is the common denominator for accomplishment in every area of marine interest."

Several years ago the Department of Commerce concluded that the execution of its historic mission "to foster, promote, and develop the foreign and domestic commerce" of the United States was inextricably coupled to scientific and technical advancement. In recognition of this fact the Secretary of Commerce in 1962 obtained authority from Congress to establish an additional Assistant Secretary for Science and Technology.

I am very glad that he did because I happen to like this job.

Secretary Stans has underscored this understanding. Recently in a speech in Boulder, Colo., he said that he hoped one of these days that the Department would be called the Department of Commerce and Technology because that more properly describes the activities of the Department of Commerce than the one word Commerce.

In continuing its emphasis on the crucial interrelationship between national economic development and science and technology, the Department, in 1965, established under Reorganization Plan No. 2 the Environmental Science Services Administration, commonly known as ESSA, to serve as a national focus for our efforts to describe, understand and predict the state of the oceans, the state of the lower and upper atmosphere, and the size and shape of the earth.

I am very pleased to state that the foresightedness in the formulation of ESSA has provided the Department with the capability to respond to many of the scientific and economic recommendations contained in the Marine Commission's report and in the objectives set out in H.R. 13247.

In addition to ESSA, the Department in fulfilling this combined technological and economic role has the following activities and capabilities which could contribute to marine science objectives.

A. The Maritime Administration of the Department has capabilities in ship design, port development, and marine transportation engineering—and a record of innovation in these areas that should be useful in tackling the problem of developing more efficient commercial marine vehicles.

B. The capabilities of the National Bureau of Standards in developing and calibrating instruments for scientific and engineering needs could be especially useful for marine instrument development. It also has a strong competence in systems analysis which would be vital in planning and carrying through a national marine program.

C. Through its Clearinghouse for Scientific and Technical Information the Department has a unique national capability for the organized dissemination of technical information.

D. The Department's Economic Development Administration, EDA, can contribute to marine industry development through its planning and assistance activities aimed at bringing new economic opportunity to geographical areas with idle and underused work forces.

E. The Department's Business and Defense Services Administration undertakes a variety of activities aimed at aiding industrial growth and development and could provide a wide range of survey, analytical, and interpretative data of value to a fledgling marine industry.

F. The staff and programs of the Department's Bureau of International Commerce should be invaluable in affording knowledge of the complex international aspects of marine exploitation and commercialization.

Thus the Department of Commerce not only has the competence to assist in any development of a broad and comprehensive marine science and technology program, but also the resources and organization to assist in the exploitation of opportunities in the marine area.

My reason for outlining to you the conviction of the Department that today science and technology is indeed the "common denominator" and even touchstone of national economic development is to emphasize our satisfaction with the recognition of this principle in the Marine Commission's report.

I would now like to discuss some of the major recommendations contained in the Commission's report.

NATIONAL CAPABILITY IN THE SEA

In the marine science area the Department believes that the Commission has appropriately identified the need for scientific and engineering knowledge as the basis upon which to develop the programs it has proposed. We have long subscribed to the principle that an understanding of the planetary oceans is a necessary goal, and through ESSA the Department has already made effective contributions toward achieving this end.

Further, this Department has a strong interest in developing civil marine technology not only to further the Department's own marine-oriented missions but also because of the Department's responsibilities to foster industry and commerce which depend upon that technology for growth.

Further, the Commission's recommendation for national technology programs is now being evaluated by the National Technology Projects

Task Force of the Marine Council. I am presently serving as Chairman of this group. In this analysis my task force has been examining the programs of Federal agencies with a view toward identifying the timeliness of each technical project and assessing the value of its anticipated "payoff" to this Nation's oceanographic mission. We are now in the middle of this analysis.

The Commission's recommendations for developing programs to insure the needed manpower for an increased national marine effort merit careful consideration. The Maritime Administration is responsible for predicting manpower requirements for ships engaged in our foreign and domestic trade and the associated training to meet them. For example, the Maritime Administration supervises the U.S. Merchant Marine Academy at King's Point and assists the various State maritime academies.

MANAGEMENT OF THE COASTAL ZONE

The Commission is rightfully concerned with the management of the coastal zone and the Department of Commerce shares the concern of the Commission over the possible adverse effect on the management of our coastal zone arising from the problems of conflicting interests of user groups and the overlapping laws and regulations controlling coastal zone activity.

We consider this area to be one of high priority among the marine problems to be addressed by the Federal Government. A task force of the Marine Council is already considering the recommendations of the Marine Commission as to the coastal zone.

The Department believes that in order to establish an adequate basis for decisionmaking in coastal zone management there is a need for much additional and continued information on conditions in the coastal zone. The Department of Commerce has already made a substantial contribution in this area.

The Department also believes that there should be increased emphasis on recreation and public access to the water in the planning and funding of projects. Because of its interest in fostering regional and economic development the Department of Commerce through EDA has supported programs for developing recreational facilities. It should be noted, however, that a consideration in the development of any facilities in the coastal area is the need to protect and maintain quality of the environment in which they will be located.

An excellent example of how the coastal zone can be systematically developed is found in the marine resources programs of the Coastal Plains Regional Commission which was established by the Secretary of Commerce under the authority of the Public Works and Economic Development Act of 1965.

I have here a report of the marine resources program of the Coastal Plains Regional Commission, and with the permission of the chairman, I would like to include a report of this activity.

Mr. LENNON. Without objection, it may be placed in the record at this point.

(The report follows:)

[From the Offshore Technology Conference]

The Marine Resources Program of the Coastal Plains Regional Commission

By

Joseph M. McCabe, Coastal Plains Regional Commission

Offshore Technology Conference on behalf of American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., The American Association of Petroleum Geologists, American Institute of Chemical Engineers, American Society of Civil Engineers, The American Society of Mechanical Engineers, The Institute of Electrical and Electronics Engineers, Inc., Marine Technology Society, Society of Exploration Geophysicists, and Society of Naval Architects & Marine Engineers.

This paper was prepared for presentation at the First Annual Offshore Technology Conference to be held in Houston, Tex., on May 18-21, 1969. Permission to copy is restricted to an abstract of not more than 300 words. Illustrations may not be copied. Such use of an abstract should contain conspicuous acknowledgment of where and by whom the paper is presented.

Abstract

The Coastal Plains Regional Commission, chartered on July 29, 1967, is a multi-state regional action planning commission whose purpose is to foster and induce orderly, accelerated economic growth in the Coastal Plains of North Carolina, South Carolina and Georgia.

The Commission is a Federal-State partnership. It was established pursuant to Title V, Public Works and Economic Development Act of 1965. The membership of the Commission is composed of a Federal Co-chairman, appointed by the President, and the Governors of the respective states, one of whom is State Cochairman.

This paper explains the rationale of the regional approach to economic development planning. It describes the Commission's goal and the progress which it has made in its six target areas: Transportation, Agriculture, Tourism, Training, Industrial Development, and Marine Resources. This paper describes in some detail the Marine

Resources Program which has been developed by the Commission staff and the Marine Resources Advisory Committee. This paper explores briefly each sub-area in the program: Recreation, Sports fishing, Commercial fishing, Minerals and Chemicals, Transportation, Research and Development, and Land and Water Use Planning. The balance of this paper focuses on those activities of the Commission which relate to offshore mining.

A Nation of Regions

In 1965, the Joint Economic Committee of the U. S. Congress issued a report, stating: "Although economic expansion benefits most of the Nation by providing more income and jobs, it passes by some regions of the country."

In 1966, President Johnson warned "The cities will never solve their problems unless we solve the problems of the towns and smaller areas."

In 1967, the Republican Coordinating Committee's Task Force on Job Opportunities

stated: "Our rural areas are being depleted of people... What becomes of these people? They move into our great cities... By creating a kind of urban crush they create a problem in the cities to which they go. By depopulating the countryside, they create a problem in the rural areas from which they come."

That same year, while most Americans were nervously watching looting, shooting, and burning in these great cities, the President's National Advisory Committee on Rural Poverty reminded us that "The heavy migration from rural America to the blighted areas of our major cities clearly shows how bad economic and social conditions are in rural areas.... Rural poverty is so widespread, and so acute, as to be a national disgrace, and its consequences have swept into our cities violently."

"Contrary to popular impression, all the rural poor do not live on farms, nor are all of them Negroes. Most live in small towns and villages. Only one in four of these rural families lives on a farm. And of the 14 million rural poor, 11 million are white."

As different interested groups helped Congress focus on the problems of hunger, malnutrition, substandard housing, chronic ill health, functional illiteracy, inadequate training, and hollow lives, Federal programs began to proliferate. Most of them attacked these symptoms of the basic deficiencies in the nation's economic structure. Because they were piecemeal approaches, usually unrelated, and sometimes in conflict, they became difficult to administer. Because they engaged Federal officials in hand-to-hand struggles with local problems, they threatened the continued existence of the Federal System.

In 1965, Congress decided to experiment with a new type of agency which would attack the economic causes of the social symptoms of our national malaise and which would reinvigorate the Federal System by strengthening the role of the Governors in shaping and executing national economic policies.

For many years, the Appalachian Mountain range had been given national recognition as a major problem area. It was studied

and re-examined by numerous public and private bodies. Finally, in 1965, Congress passed the Appalachian Regional Development Act, which created a State-Federal partnership for regional economic development. Congress that year also added Title V to the Public Works and Economic Development Act recognizing that other regions had similar problems and could probably benefit from a similar approach. In 1966 and 1967, five other Regional Economic Development Commissions were established:

1. New England, which included all of the six New England States;
2. Upper Great Lakes, which includes portions of Minnesota, Wisconsin, and Michigan;
3. Four Corners, which includes portions of Arizona, Colorado, New Mexico and Utah;
4. Ozarks, which includes portions of Arkansas, Kansas, Missouri, and Oklahoma; and
5. Coastal Plains, which includes the 159 counties in Georgia, South Carolina and North Carolina which lie between the Piedmont and the Atlantic Ocean.

The Coastal Plains Regional Commission

The Public Works and Economic Development Act of 1965 authorized the Secretary of Commerce to designate regions composed of contiguous states or parts of states which have close geographical, cultural, historical, or economic relationships and which have lagged behind the nation in economic development. The mountain counties of Georgia, South Carolina, and North Carolina were part of Appalachia. The Piedmont counties in these states were relatively prosperous, but the 159 counties of the Coastal Plains were designated by Secretary John T. Connor as an economic development region on December 21, 1966. The Coastal Plains Regional Commission was officially chartered on July 29, 1967.

The Commission consists of the three Governors and a Presidential appointee who

ranks as an Assistant Secretary of Commerce. The first State Cochairman was Governor Robert E. McNair of South Carolina; the first Federal Cochairman was J. Russell Tuten, a former Congressman from Brunswick, Georgia.

The Commission determined to keep its staff small and to work through the existing Federal, State, and Local agencies to the maximum possible extent. It established its headquarters in Washington, D. C. and a field office in each state capital. It now has seven professionals in its headquarters and two in each field office.

The original Act provided that the Federal Government would pay all of the administrative costs of each regional commission the fiscal year in which it was established and for the next two fiscal years as well. After this period, the States would fund half of these costs. The Federal Government also agreed to provide Technical Assistance funds for research and planning. In 1967, shortly after the Coastal Plains Regional Commission was established, Congress amended this Act in two aspects:

1. It authorized the Commissions to carry out supplemental grant programs to assist state and local agencies to supply their share of certain Federal matching grant programs; and
2. It directed each commission to prepare a long-range, comprehensive economic development plan for its region.

The Commission's Goal and Strategy

The Coastal Plains Regional Commission determined that its goal was to close the "income gap" -- to raise per capita income of the Region to that of the Nation. In 1959, almost five million people lived in the 159 counties which later formed the Coastal Plains Region. On the average they earned that year about \$800 less than the average American. By 1965, there were 5,395,000 of them and that year they earned about \$1,000 less than the average American. The income gap in 1959 was \$4.2 billion; by 1965 the gap

had widened to \$5.3 billion. Economists have projected that this income gap will continue to widen at an increasing rate; the Commission's goal is to close the gap.

The Commission does not believe that any amount of public funds alone will solve the real problem. This problem must be solved by private enterprise, the profit motive, and enlightened self-interest coupled with appropriate public investment by Federal, State, and local agencies. The strategy of the Commission is to guide available public investments in ways that will attract to the Region the private investments which will create additional jobs and income.

In January of last year, the Commission adopted its initial action planning document which identified a set of target areas for public and private investment opportunity. Last December the Commission adopted its first comprehensive long-range plan, which identified critical policy variables designed to influence private investment target variables. The Commission determined that it would not become a welfare agency, that it would instead emphasize those public investments which would spur and support private investment, that it would concentrate on the development of new basic industries, and that it would focus public investments in recognized centers of regional growth to the maximum extent possible.

Given its concentration on private investment as the leading factor in regional growth, the Commission has identified six target variables deemed important elements in private investment decisions:

1. factors affecting the basic cost of production,
2. factors determining the demand for products which could be produced economically within the Region,
3. factors affecting the quality of the Region's economic, social, and political environments,
4. factors determining available information on regional investment opportunities,

5. factors impinging on the level of regional entrepreneurial and managerial abilities, and

6. factors affecting the technological level of production and distribution within the Region.

The target variables for investment decisions are, in their turn, judged susceptible to five policy variables:

1. public investments,
2. tax and other fiscal policies,
3. banking and monetary policies,
4. regulatory practices, and
5. institutional policies.

Finally, these target variables and policy variables are then placed within six sectors of the economy in which intensified efforts can produce accelerated development:

1. Education and manpower
2. Industrial development
3. Agriculture and forestry
4. Tourism and recreation
5. Transportation and
6. Marine resources.

The Commission's Target Areas

These six target areas are inter-related. Two of them are resource oriented: Manpower Development and Marine Resources. Three of them are product oriented: Agriculture, Industrial Development and Tourism. The sixth is concerned with the most essential type of economic infrastructure, Transportation.

The Commission knew that the Region suffered from underemployment even more than it suffered from unemployment. Many reliable and responsible workers are not utilized to the full extent of their abilities. They could pro-

duce and earn much more if the proper industrial opportunities were available to them.

The major emphasis of the Commission's Industrial Development Program is to attract into the Region the high-wage/high-growth industries that will provide these opportunities for psychological and financial enrichment.

The Manpower Development Program is designed to ensure that these workers' skills are up-graded so that they can be effective in the jobs that will be opening for them. This program must also see that the currently unemployed are contacted, motivated, and trained to replace the workers who are moving up the economic scale.

The Commission has heavily relied on expert consultants for the initial development of these programs. Battelle Memorial Institute has identified 100 industry groupings which are high-wage/high-growth and particularly well suited to location in the Region. They have also helped the Commission to understand why these industries are not already locating in the Region in greater numbers and what can be done to overcome these barriers to development.

The Commission also believed that it should establish one or more regional manpower training centers to serve as experimental laboratories where complete occupational and technical education below the college degree level could be accomplished and blended to meet the needs of a rapidly changing economy. The Commission intends that these centers will provide coordinated recruitment, counseling, and placement -- as well as training -- and will become catalytic agents that motivate the people of the Region to improve the economic structure.

The Commission contracted with United Dynamics, Inc., to analyze existing institutions, agencies, curricula, facilities, and programs in relation to the current economic base of the Region, in order to design the needed improvements. The Commission also has used all of its supplemental grant funds to improve and expand occupational and technical training facilities.

About 15 percent of the Region's work force is engaged in farming. The Region has

had an abundance of inexpensive farm laborers. The main cash crops of the Region have been less susceptible to mechanized cultivation and harvesting than have the major crops grown in other regions. These two factors have combined to make agriculture in the Region more labor intensive than it has been recently in most other parts of the Nation. This is changing. Thousands of farm workers are being displaced each year by increased mechanization. The Commission wants to encourage efficient farming and to develop new crops and new processing and marketing organizations and techniques. However, it also recognizes the need for smoothing the transition of thousands of men from the farm to the factory. This is another task of the manpower program.

The Region is ideally located for the development of a major tourism and recreation industry. Several areas such as Myrtle Beach, South Carolina and portions of the Outer Banks of North Carolina have seen significant tourism development in recent years. But most of the recreation potential of the Region is still undeveloped. The Commission contracted with Leisure Systems, Inc. to identify several commercial tourism investment opportunities, to explain why the Region has not already developed its potential more fully, and to recommend ways in which the Commission could help this industry expand. Leisure Systems identified twelve potential, quality attractions which would be profitable for their investors and which would enhance the Region's image as a destination for the vacation-bound. It also developed recommendations for the improvement of promotion, management, and training. Leisure Systems developed detailed feasibility data for each project.

The transportation system of a region shapes and limits its development. Tourists drive only where there are roads; airplanes land only at airports; grain is shipped only through those ports which have suitable elevators. The Commission asked Wilbur Smith and Associates to recommend a comprehensive developmental transportation system. In the past, highway construction funds have been spent where traffic counts have shown that they were needed to facilitate

the flow of existing patterns of communication and transportation. The Commission believes that roads should also be built to enable relatively poor and isolated areas to be linked with growth centers and enable new and more prosperous patterns to develop. Although these recommendations are concerned chiefly with highways, some also concern the expansion of airport, rail, barge, and port facilities.

Just as these five target areas are inter-related, they all blend into the Commission's sixth target area, Marine Resources. It is, in a sense, the wet side of every other program. It is focused on the Coastal Zone, but it affects the entire Region.

The Marine Resources Program

The Commission selected Marine Resources as one of its target areas because the Region has one major and unique resource that has barely been tapped - the Atlantic Ocean. The Commission believes that the Region's rivers, estuaries, and off-shore water represent substantial long-range potentials, as well as opportunities in the immediate future in the more traditional ocean-based industries such as recreation and fishing.

The objectives of the Commission's Marine Resources Program are:

- (1) to assess the potential for increasing Regional income through the orderly development of marine resources, and
- (2) to develop and implement a program that will have the greatest impact toward the full exploitation of this potential.

The Commission agreed that each State member would appoint three persons to an advisory group to assist in developing a Marine Resources Program.

The following were appointed to the Marine Resources Advisory Committee: from Georgia - Dr. Vernon J. Hurst, J. Marcus Stubbs and W. D. Trippe; North Carolina - Dr. C. E. Bishop, Dan E. Stewart and Joe C.

Eagles, Jr.; South Carolina - Clyde A. Ellzroth (later elected chairman), J. E. Guerry, Jr., and Wallace E. Pate.

The first meeting of this committee was held on May 29, 1968, in Columbia, South Carolina with all members present.

Governor McNair, then Commission State Cochairman, opened the meeting and described the various Commission programs, emphasizing the importance of relating them all into a comprehensive program for the economic development of the entire Region. The committee was briefed on the Commission's six target areas and some of the ways the marine resources of the Region might be developed to help close the income gap. The committee asked the staff to present additional information on the problems and potentials of the Region's marine resources, at its next meeting in Savannah, Georgia, June 19-20, 1968.

The second meeting began with a tour of Skidaway Island and a briefing concerning the development plans of Georgia's Ocean Science Center of the Atlantic. On June 20 with each member of the advisory committee present, the Commission staff surveyed the current status, potentials, and problems of selected marine-related industries.

In order to simplify the necessary analysis of the economic potential of the Region's marine resources, the Advisory Committee divided this target area into seven subareas:

1. Commercial Fishing
2. Sports Fishing
3. Recreation and Tourism
4. Minerals and Chemicals
5. Water Transportation
6. Research and Development and
7. Land and Water Use Planning.

In selecting its six target areas, the Commission did not strive for mutually exclusive categories. (Changes in the agricultural sector, for example, will stimulate compensating changes in industrial development, training, and transportation. They may also influence commercial tourism and even the use of marine resources.) The Marine Resources Advisory Committee was similarly willing to accept overlapping subareas, in order to measure the economic potential of each, to learn how apparent conflicts can be reduced, and to find the balance between preservation and development that offers the best promise for the Region now and in the years to come.

About 10,000 members of the Region's labor force are regularly employed in commercial fishing, wholesaling and processing. During peak seasons an additional 4,000 casual employees enter these occupations. Most of the generalizations frequently made about commercial fishing in the United States apply to the Coastal Plains Region's portion of this industry: the harvesting methods are primitive, the processing is labor-intensive and the marketing is relatively disorganized. Four areas have been identified in which the Region's commercial fishing industry could be enhanced: resource management, harvesting, processing, and marketing. Most of the sea food consumed in the Nation is imported; both the catch and the per capita consumption of sea food could be increased significantly. However, the evident costs of the solutions to the Nation's fisheries problems far exceed both the Commission's limited resources and the benefits which would be likely to accrue to the Region. The problems of the fishing industry like those of the shipping industry are national rather than regional.

The improvements in the commercial fishing industry of the Region which are likely to result from the Commission's efforts will probably emerge from two other subareas of its Marine Resources Program, Research and Development and Land and Water Use Planning, which are discussed later in this paper.

Investments in the expansion of sports fishing offer much quicker and larger returns to the Region than do comparable investments in commercial fishing. The amount spent in the Region by over a million sports fisherman already far exceeds the combined income of all the Region's commercial fisherman, and sports fishing in the Region can be significantly increased. The Commission's programs in Transportation and Commercial Tourism as well as its efforts in Research and Development and Land and Water Use Planning should foster and facilitate this expansion.

Sports fishing is only one of several forms of ocean recreation. Sun-bathing and swimming, beach-combing and boating provide pleasures which are sought by millions in the Midwest and Northeast. Most of the bays and sounds, the beaches and off-shore islands of the Carolinas and Georgia are uncrowded even at the peak of season. They are largely unknown. Millions of Americans know where Cape Cod is, but few could place Nags Head. The Coastal Plains Region will eventually become the Nation's playground. Its location is strategic. It needs to develop quality attractions and to promote the Region as a tourist destination. The Commission has been assisting potential investors through the feasibility studies and investment seminars, which were mentioned earlier in connection with the Commercial Tourism Program.

There are seven ocean ports and several river ports in the Coastal Plains Region. These facilities have expanded significantly in the past few years. The Commission will help the State port authorities plan the accelerated expansion which progress in the Commission's Industrial Development and Transportation Programs will require. Port facilities and services represent an important element of the Region's economic infrastructure. Economic development both depends upon and demands their expansion. They are an excellent example of a self-amortizing public investment in economic development.

The Advisory Committee has recommended and the Commission has agreed to

place the main emphasis of the Marine Resources Program on Research and Development. Five purposes of this effort have been identified:

- o Enhancing the state's ability to manage its common property resources.
- o Enabling the residents of the state to engage in marine enterprises more productively and profitably.
- o Strengthening the ability of the state to attract high-technology industries.
- o Enabling the state and its residents to compete more successfully for Federal marine research and development contracts and grants, and
- o Enabling the state and its residents to better understand and utilize its marine resources.

In each state numerous laws and regulations govern *fishing and mining*, yet these laws lack a sound scientific basis. No one is sure whether these codes serve the public interest or simply discourage mineral exploration and modern fishing. Academic institutions and public agencies in the states are improving their capability to perform needed research, and the Commission intends to help them.

Technological advances are worth little until they are exploited by entrepreneurs. The states are expanding existing extension services and creating new services where necessary. The Commission intends to help them.

The Commission's Industrial Development Program is designed to attract high technology industry. The Region offers more than level land and ample ground water. It has almost 600 miles of coastline and 3 million acres of estuaries. It has over 30,000 square miles of continental shelf, and it is adjacent to the Blake Plateau.

The Commission intends to promote the creation or research and development centers

of excellence which will be attractive locations for industries specializing in marine science and technology.

In 1966, the people of Chatham County (Savannah), Georgia voted nine-to-one favor of a \$3.6 million bond issue to build a bridge to Skidaway Island where the state planned to develop the Ocean Science Center of the Atlantic. Today, the bridge and the center are taking shape.

In 1968, the University of North Carolina at Chapel Hill instituted a Curriculum in Marine Sciences leading to the M. S. and Ph. D. degrees, jointly with North Carolina State University.

The Commission intends to foster and augment these activities.

The Region has numerous Department of Defense installations, but most of them are basic training camps which have a relatively small impact on the Regional economy. Although the Navy spends more than half of the Federal Marine Science funds, little of this money is spent in the Region. By exploiting favorable environmental characteristics and using public funds as a catalyst, the Commission intends to demonstrate to private enterprise and to the Federal government that much more of the nation's essential marine research and development should be performed in the Coastal Plains Region. It could be done there as well as anywhere else, and doing it there will spur the economy of a lagging region.

All of these activities will be accompanied with specialized training programs and public information activities, so that the people of the Region will have a greater appreciation of the marine environment and will be able to acquire the skills they will need to exploit it more fully.

The Commission on December 19, 1968 approved a Resolution on Marine Resources which the Advisory Committee had recommended. Two of these actions concerned this research and development effort. The other two concerned a Marine Use Profile of the Region

and a study of its mineral potential.

The Commission granted \$30,000 to each state for a comprehensive marine resources development study. These studies consist of two phases. The first is an inventory of the personnel, programs, and facilities now employed in marine research and development. The second phase is a set of recommendations for the improvement and expansion of these programs and facilities.

More than twenty marine research laboratories already exist in the Region. Most of them are small and little coordination exists among them.

The Coastal Plains Regional Commission decided to create an Institute for Marine Development Services in order to:

- o Facilitate communications among the Region's scientists and institutions engaged in research and educational efforts relating to marine resources.
- o Communicate the results of marine research and development activities, in order to increase the technological proficiency of the private sector of the Region's economy,
- o Maintain constant liaison between the Commission and the work that is taking place in marine research and development,
- o Assess periodically the effectiveness of the Region's research and development programs and activities in marine resources, and
- o Advise the Commission concerning actions required to close the income gap by exploiting marine resources.

In carrying out these functions, the Institute will conduct conferences, seminars, and workshops and publish relevant materials. Consulting services are provided to institutions in the Region in the process of developing research and education programs.

The Commission's Marine Resources Advisory Committee will act as a Board of Trustees for the Institute. This Committee will assist the Director in developing and implementing annual programs of work.

The Institute will also have several technical committees to help guide its program. These technical committees will be composed of professionals in the different sub-specialties in marine resources drawn from the Region as well as from other parts of the country.

Land and Water Use Planning was selected for special emphasis in the Marine Resources Advisory Committee. The Commission is charged with preparing long-range, comprehensive economic development plans. The need for systematic planning is most obvious in the Coastal Zone. The economic conflicts are most intense there, and the social and political considerations most complex. Competition for these resources will grow more intense, and many decisions, once carried out, can never be undone.

The Commission wants to raise the per capita income of the Region by attracting industries that will create high-wage job opportunities. It wants to achieve this goal as soon as possible. However, it does not want short-term gains that will destroy the long-term potentials of the environment. The state and local governments need sound advice for making land use decisions. The Commission intends to help them by sponsoring a study which will produce a Marine Use Profile. This study will include:

- o collection of data concerning the present utilization of Coastal Zone resources and the social and economic ends served,
- o analysis of the effectiveness of past and present measures for determining this utilization,
- o identification of the potential of these resources,

- o evaluation of new or different measures for encouraging or requiring optimum utilization of the resources,
- o preparation of maps depicting existing resources, existing uses, and optimum uses, and
- o recommendations concerning implementation, including model codes for resource management.

The Commission has requested the U. S. Department of Housing and Urban Development to assist in funding this study. The purpose of this study is to identify the economic potential of the Coastal Zone resources and to provide those with the responsibility for decisions with an analytical framework for evaluating each potential use in terms of particular goals and objectives.

Minerals and Chemicals

The need for a Marine Use Profile is most evident when considering the development of minerals and chemicals industries in the Region. The Advisory Committee and Commission staff have been trying to obtain a definitive evaluation of the Region's mineral potential. A considerable amount of information has been compiled from published sources by the State geologists as well as by consultants. This effort will be continued by the Marine Use Profile Study. It will develop maps depicting geologic strata and will develop model codes designed to foster exploration and exploitation in ways that will cause minimal long-run damage to the environment. The Commission has also urged the appropriate Federal officials to conduct the needed bathymetric and geological surveys of the adjacent continental shelf.

In trying to evaluate the mineral potential of the Region, the Commission has repeatedly been advised that commercially extractable concentrations of petroleum probably exist off-shore. Exploration thus far has not resulted in a producing well; however, there has been very little exploration.

Several years ago a relatively extensive phosphatic recovery operation began on the Pamlico River in Beaufort County, North Carolina. Within the past year, a concentration of phosphate which may be the largest in the world was discovered near Savannah, Georgia. The effort to lease the marshlands which overlay part of this phosphate bed led to a public crisis and the lease was not granted. This crisis re-emphasized the need for the Commission's Marine Use Profile and for model codes for resource management.

The present value of the Region's mineral production is less than \$300 million per year. No one, of course, can estimate the potential production. There has been a close correlation between exploration and discoveries. Perhaps the prospectors have been looking only the right places, or perhaps the Region has vast mineral wealth that will not be found until someone looks for it.

The Marine Resources Program of the Coastal Plains Regional Commission can be the means of accomplishing two important national goals simultaneously:

- o Increasing the utilization of these resources and

- o Developing the economy of a lagging region.

The members of the Offshore Technology Conference would serve our nation well by suggesting improvements in this program. In particular, how can the Commission find out whether diamonds lie buried in its backyard? How can the Commission encourage and assist private enterprise to explore for these potential resources?

Acknowledgment

The author, although accepting full responsibility for the views expressed, nevertheless owes a debt of gratitude to other members of the Commission staff who in numerous conferences have helped develop the information and philosophy presented here. In such a case it is difficult to determine clearly where any one person's thoughts begin and end. Thus much credit for this article is due to Mr. Charles W. Coss, Executive Director; Mr. F. L. Parnell, Assistant Director; Dr. E. Walton Jones, former North Carolina Field Director; and Mr. Joseph Gabbard, Program Officer. The author also acknowledges the assistance of the members of the Commission's Marine Resources Advisory Committee, particularly its Chairman, Mr. Clyde Eltzroth.

MARINE RESOURCES

Dr. TRIBUS. Now, as to Marine Resources, the Department of Commerce plays a supporting role in the development of marine resources—both through the encouragement of the private sectors of our economy, and through continued cooperative efforts with the Department of the Interior. In this latter regard, our Department intends to continue to cooperate in the preparation of maps of our Continental Shelf and slopes by conducting the necessary surveys and by providing existing data for these regions in conjunction with our own on-going survey program. This we consider to be in keeping with the intent of the Commission.

GLOBAL ENVIRONMENT

The global environment is a continuing and first priority concern of the Department. Our Department participates with the Department of Health, Education, and Welfare in seeking the solution to problems of air pollution. We also are a member of the recently formed Council on Environmental Quality which is concerned with the total environment.

This requires that our knowledge of the environment be improved. Programs of global exploration, monitoring, prediction, and determining the feasibility for modification of the environment contribute to this objective. The capabilities of our agency, ESSA, have been developed according to this concept.

ESSA already has in operation the principal elements which would be required for the "National Environmental Monitoring and Prediction Service" proposed by the Commission. Many of these activities are performed in collaboration with other nations. The recommendations of the Commission would involve expansion of ESSA activities. This Department has lead agency responsibility for the U.S. weather watch program and more recently the civil focus for the coordination of marine environmental prediction. We are vitally interested in the implementation of these programs.

ESSA also works with agencies outside of the Government in planning national or worldwide atmospheric activities. The global atmospheric research program, for example, GARP, is one which is planned with full collaboration and leadership of ESSA.

Just the other day I spent about an hour and a half with the leading experts in meteorology who were gathered in conference with Dr. White and others from ESSA to plan this Nation's participation in the global atmospheric research program. ESSA has long been a champion of the principle that the prediction of the weather requires a global approach.

TECHNICAL AND OPERATING SERVICES

Technical and operating services are discussed in the Commission report. We are also pleased to note that the Commission has endorsed our efforts for providing mapping and charting services, environmental data services, and standards for instrument development to the many and diverse user groups.

The Commission, however, has recommended that we accomplish our mapping and charting schedules in a shorter period of time than we,

ourselves, had planned for the Continental Shelf and coastal waters. To accomplish this would require an acceleration of our current plans and additional resources would be needed.

With regard to the Commission's concern for standards, calibration, and test facilities for instrument development, I am please to report that the National Bureau of Standards has recently assumed the role of providing primary standards for the National Oceanographic Instrumentation Center. We believe this will be an important contribution.

I have here a report from the National Oceanographic Instrumentation Center which describes the kind of projects now being carried out by the National Bureau of Standards in cooperation with NOIC.

There is work on the calibration of flowmeters. There is work on sound velocity measuring systems. There is work on time standards development. There is a development of a shallow water environmental facility.

Strange as it may seem, it is extremely difficult to measure very, very low velocities of flow and the Bureau of Standards cooperates in the development of new techniques for measurement and also for the procedures for tying these kinds of measurements into the rest of the national measurements system so that measurements made at sea can be made to square with those that are made on land.

I will make this report available to the recorder if the chairman wishes.

Mr. LENNON. We would like to have it, and we appreciate it, sir.

Dr. TRIBUS. Thank you.

Before turning to the organizational recommendations of the Commission and those contained in H.R. 13247, I want to state a few words about the role of the Maritime Administration in ocean engineering.

At this point, also, I would like to observe that I think that Dr. Keim of the National Academy of Engineering was correct when he said we ought not talk about ocean engineering as something very special; we ought to talk about engineering in the ocean, because what is most needed is to treat the engineering problems of the ocean in the modern manner that we treat other engineering problems and to apply to the problems of the ocean the appropriate techniques of engineering that we have developed in other areas.

This is one of the things that the Maritime Administration can and does do.

A major marine transport capability is required to explore the oceans and to utilize their resources to enhance our national commercial transportation and our national security. Such a capability currently exists in the Maritime Administration as a result of its current mission to promote waterborne commerce and as the national agency concerned with all aspects of marine transportation and technology. In the conduct of its programs, the Maritime Administration has developed capabilities for economic analysis, research and development, ship design and construction, and ship operation in conjunction with the maritime industry.

The current Maritime research and development program is based on the recent Woods Hole Maritime Conference of Government and industry. The conference recommended projects covering a broad spectrum of advanced marine programs. A total of 110 specific program elements was selected from the hundreds that were considered.

I have here a copy of the Woods Hole Conference that was held under the auspices of the National Academy of Sciences and MarAd. In this conference we had representatives from industry, from labor, from engineering, and from science. We brought them all together and asked them to discuss with us what are the technological needs and how they interrelate.

This report I will make available to the recorder, and we have sufficient copies to give one to each member of the committee if you so desire.

MR. LENNON. We thank you for them.

DR. TRIBUS. I would also like to say in passing that this is the way I think one has to go about developing the relationship between Government and industry. The total amount of money that private industry is going to invest in the ocean will be many times greater than the amount the Federal Government will invest in these kinds of enterprises.

At least that must be true if we are going to be successful. Therefore, it is very important that we learn how to develop the governmental program in coordination with industry so that we help rather than hurt the development of these enterprises. I think the Woods Hole Conference is an excellent example of how to do this.

The recommended spectrum of research projects ranges from near-term improvements in the 20-knot ships in operation today, to the high-speed (30-40 knot) unitized cargo ships of the 1970's.

The Maritime R. & D. program includes basic advanced systems engineering and technology, as well as major advanced marine ship systems, terminals, and related support.

An example of the Maritime R. & D. program is the development and operation by Maritime (in conjunction with the Atomic Energy Commission) of the world's first nuclear-propelled commercial ship (NS *Savannah*). Maritime performs this program jointly with the Navy and has utilized Navy capability and laboratories cooperatively in other areas.

Maritime has established and proposed programs in port terminals and cargo handling areas including various aspects of offshore terminals, deep-sea mooring, semisubmersible and submersible shipping systems, offshore cargo systems and feeder networks. The relationship of sea transport with other modes of transport (intermodal) has been considered in the development programs and economic analysis.

Other programs under way at Maritime include research on pollution and joint programs with universities and other national laboratories. Other joint programs include efforts with Navy on mobile and emergency porting systems and close liaison with the marine industry to catalyze and promote industry-sponsored developments of all types.

Further, Maritime has been responsible for the design of and procurement of fishing vessels and nautical charting and oceanographic survey vessels under requirements initiated by the Department of the Interior and the ESSA's Coast and Geodetic Survey.

Maritime has initiated a scientific and technical data information exchange program (SIS), and in conjunction with the National Academy of Sciences is currently exploring means of expanding ocean

engineering and marine graduate level programs with the maritime universities.

In summary, the Maritime Administration provides a major national resource in the technology, design, and procurement of commercial maritime transportation systems, and has demonstrated its ability to interface effectively with commercial developments.

ORGANIZING A NATIONAL OCEAN EFFORT

Now I want to come to the matter of how to organize a national ocean effort, and I would like to comment on the recommendations of the Marine Commission for an organization to carry out its proposed national ocean program and also to comment on the organizational aspects of H.R. 13247.

The Commission proposes that there be established a new independent agency to be known as the National Oceanic and Atmospheric Agency, commonly called NOAA, as the principal instrument within the Federal Government for administration of the Nation's civil marine and atmospheric program.

It is proposed that there be included within NOAA the Coast Guard, the Environmental Science Services Administration, the Bureau of Commercial Fisheries, the national sea grant program, the U.S. Lake Survey and the National Atmospheric Data Center.

There is no doubt in our minds that the competence in ESSA which was created by the Department of Commerce to serve as a national focus for our efforts to describe, understand, and predict the state of the oceans, the lower and upper atmosphere, and the size and shape of the earth, would be invaluable to such a new agency.

I must state, however, that I have serious doubts as to whether the Commission's recommendation to establish NOAA is, in fact, the best organizational method for marshaling our national efforts in the oceans.

For example, a look at the composition of NOAA leads to the conclusion that it is primarily oriented to science and technology. That is as it is set forth in the Commission's report.

I concur with the statement of Dr. Kavanagh, chairman of the Committee on Ocean Engineering, National Academy of Engineering, in his testimony before your committee. He stated :

I believe that the ocean engineering effort in resource utilization must be interfaced with the economic and social goals of the Nation.

To repeat an often quoted phrase, engineering and science are not ends in themselves, but tools to achieve our national goals. Therefore, we believe any agency undertaking a national marine program must also have the additional capability to act as a sort of "entrepreneur" for the Nation in exploiting opportunities in the marine area.

Accordingly, while we regard the Commission's concept of NOAA as imaginative and thoughtful, it may not be the best vehicle for the Nation's effort in the marine environment. From others who have testified, I am sure you are well aware of the action taken by the President on the Marine Commission report, and that both its program and organizational recommendations are being seriously studied.

Therefore, it doesn't seem proper for me to comment further at this time on this aspect.

Now, Dr. White, the Administrator of ESSA, will focus on those recommendations of the Commission which bear directly on ESSA.

If you wish, I am ready to answer questions now or we can proceed to have Dr. White give his testimony which is keyed to mine.

Mr. LENNON. Thank you, Mr. Secretary.

Now we will go off the record for a minute.

(Discussion off the record.)

Mr. LENNON. Dr. White, will you proceed, please.

STATEMENT OF DR. ROBERT M. WHITE, ADMINISTRATOR, ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION—Resumed

Dr. WHITE. Mr. Chairman and members of the subcommittee, I am pleased to appear again before this committee. In my last appearance I testified in my capacity as a member of the Commission on Marine Science, Engineering, and Resources. Today I come before you as a representative of the Department of Commerce in which I serve as the Administrator of the Environmental Science Services Administration.

As you know, as a Commissioner, along with other Commissioners from the Federal Government, I reserved my position on the proposals for reorganization of the Federal Government.

Mr. LENNON. Just at that point, Dr. White, for the record, the other members of the so-called Stratton Commission who were representatives of the Government in addition to yourself, are who, from what agencies?

Dr. WHITE. There was Mr. Baird, the Under Secretary of the Navy.

Mr. LENNON. Mr. Baird.

Dr. WHITE. B-a-i-r-d. Mr. Frank DiLuzio, Assistant Secretary for Water Pollution Control in the Department of the Interior.

Mr. LENNON. Thank you. You may proceed.

Mr. MOSHER. Mr. Chairman, I think we might mention that Mr. Baird since leaving the Navy has taken a personal position, an outspoken position in support of the Commission's NOAA recommendation. That might be pertinent information at this point.

Mr. LENNON. I thank the gentleman for the comment. That is the reason why I wanted to get it in the record at this time, because if somebody else didn't come back to that, I was going to do so.

Mr. KEITH. Mr. Chairman.

Mr. LENNON. Yes?

Mr. KEITH. Mr. Chairman, I regret that I have to leave for a White House meeting on shoe imports; but I will be back.

Mr. LENNON. While you are down there, you might do a little missionary work in the field. I believe you have the capability.

Mr. KEITH. Thank you.

Mr. LENNON. Thank you, sir. We are sorry you have to go.

Dr. WHITE. As Dr. Tribus has just mentioned, the Federal Government is still studying the Commission recommendation as to organization.

In my testimony which follows, I will focus on those Commission proposals which directly affect ESSA. These proposals encompass many of the objectives of H.R. 13247.

ESSA naturally takes the strong view that the problems of the physical environment are so closely related that it is no longer possible

to deal effectively, either in the provision of services or with the outstanding unsolved scientific problems except by consideration of many aspects of the total physical environment. Ocean and atmosphere are but different phases of the earth's fluid envelope and their interactions with the solid earth are in many cases critical.

It is well recognized that the hurricane is a creature of the oceans and the movement of ocean waters is a response to the winds of the atmosphere. The meteorologist needs ocean observations to predict the weather and the oceanographer needs weather observations to predict the state of the oceans.

The technology for acquiring and processing such data is expensive and has large elements of commonality.

ESSA is the only civil organization in Government that has the breadth of capabilities and authorities to cope with most of the problems of description and prediction of the marine environment. Our major functions include the mapping and charting of the bathymetry and geophysics of the ocean floor; the description and prediction of water masses and currents; the observation and prediction of the weather, wherever it is—at sea and on land; the operation of real time global warning systems for the hazards of nature; and the acquisition, storage, archival, and dissemination of geophysical data.

We also conduct extensive programs of research and development to improve our services and achieve a basic understanding of environmental processes. The systems we operate are global in character. Our satellite observing system, our survey and research operations, and our weather, seismic, and tidal stations are worldwide in character, and in many cases they are integral parts of international systems linked to similar systems operated by other nations.

Our charge is to provide environmental data and services to serve our national interests whatever they may be—defense, agriculture, industry and transportation, and wherever they may be—on land and sea and in the atmosphere.

We agree with the Commission that the touchstone of our marine future lies in the development of our national scientific and technological capabilities. We believe it is essential that a national commitment for the advancement of understanding of the planetary oceans be made a major goal of our national ocean program.

We also believe that our Nation's technological capabilities must be advanced in parallel.

We recognize, of course, that marine science and technology is but one of a number of national problem areas and that it must compete with other pressing demands for the commitment of additional Federal resources.

The Commission has proposed mechanisms for achieving greater capabilities—through our academic institutions via university national laboratories and coastal zone laboratories; through industry via the establishment of national projects; and through Federal laboratories, which the Commission correctly points out need substantial strengthening.

My organization and the Department of Commerce would expect to play an important role in such an endeavor, and we look forward to the challenge with excitement.

The Commission has raised fundamental questions about the man-

agement of our land, sea, and air environment. These concerns of the Commission are manifest in their recommendations concerning the coastal zone and the global environment.

It may very well be that these concerns and the recommendations that stem from them will be of greater importance to our Nation and mankind than even the recommendations dealing with the oceans' resources, important as they may be.

While other organizations within the Department of Commerce are more directly concerned with economic development and the management of the coastal zone estuaries, ESSA now has, and will continue to have, a significant role in providing the necessary physical environmental information required for the proper management and control of coastal activities.

For example, the management and development of the shoreline and continental shelf require that State and shoreline boundaries be precisely determined. ESSA traditionally has assisted both Federal and State Governments in boundary determinations and is currently engaged in such determinations.

The coastal mapping, tides, and geodetic programs of ESSA have been assisting the Bureau of Land Management to solve Federal jurisdictional boundary disputes with the States of Texas, California, and Louisiana. We have just launched a 5-year cooperative program with the State of Florida to determine shoreline boundaries needed by that State for its land management, conservation, and offshore resources development.

We expect such requests from States to grow as the potential for the development of their coastal regions increases, and we are accelerating our program to meet these needs.

The Commission has proposed that Congress establish a National Seashore Boundary Commission to fix baselines from which territorial seas and areas covered by the Submerged Lands Act of 1953 may be measured. The objective of this proposal is sound, and it is essential to resolve jurisdictional disputes.

ESSA is the Federal agency responsible for determining the tidal datum planes and conducting the hydrographic and geodetic surveys necessary for establishing baselines. It is the logical agency to assist in providing physical and cartographic descriptions on which legal coastlines and baselines can be delimited.

The Commission also recommended that necessary monitoring instrumentation be developed for the coastal zone. ESSA presently monitors the coastal environment and has the observing and communications networks and facilities that can be used as a nucleus from which to develop the expanded system required to meet growing local, State, and Federal needs.

We now maintain tidal stations and certain of the hydrologic networks used to forecast river water levels, and we conduct tidal and circulatory current surveys in estuarine and coastal regions. ESSA also has recently acquired a unique national facility, the survey ship *Ferrel* with its "TICUS" buoy system, for conducting tidal current surveys for safety and efficiency of navigation.

These tidal current surveys also provide circulatory data in estuaries useful in determining flushing rates to assist pollution abatement control. The *Ferrel* is being deployed during this year in Penobscot Bay,

Maine, where it is acquiring the environmental data necessary for predictions of flushing rates needed by State, local, and Federal agencies and private industry. We expect to expand this program into other estuaries as resources become available.

As for our overall task in marine pollution control in the coastal zone, we believe that it parallels our effort in air quality control. ESSA now provides specialized meteorological forecasts and services, including daily air pollution potential advisory forecasts, to assist air pollution control agencies in five major cities throughout the country.

ESSA, as the Federal environmental service organization, considers its task as one of providing Federal, State, and local agencies who are responsible for regulation and control with necessary environmental descriptions and predictions upon which control and regulation can be soundly based.

The Commission also was concerned with what man with his present and foreseeable technology might be able to do to modify and control environmental processes. It also was concerned with what man is now doing inadvertently to cause changes in the atmosphere and oceans.

These are indeed formidable problems. In our view this Nation has been long overdue in organizing itself to cope with such problems in a rational and systematic manner, but the recently formed Council on Environmental Quality is a significant step forward in attacking this problem.

In meteorology we are on the verge of learning how to control weather processes on a substantial scale. Recent developments point clearly to capabilities in a few years which will enable us to manipulate certain kinds of atmospheric processes and more importantly to do this with predictable results.

While we have not progressed as far in modification of the marine environment, the parallel capability should be developed, and the understanding necessary to accomplish this must be developed.

With regard to the global dimensions of the marine environment, the Commission proposed a global monitoring and prediction system and recommended the establishment of a national environmental monitoring and prediction system, to be called NEMPS, by this Nation.

In my view few things recommended by the Commission deserve more serious consideration. All who would go down to the seas to operate in or under them require such environmental data and forecasts. They are essential to the protection of life and property. A monitoring and prediction system would benefit the farmer in Iowa, the cattle rancher in Texas, and the forester in Montana as well.

The oceans cover approximately 70 percent of the earth's surface and interact with the overlying atmosphere through the exchange of heat and moisture. The results of this interaction do not stop at the shore. The atmosphere transports the effects far inland.

They also influence the daily operations of our land, sea, and air transport. Such a system will provide the environmental forecasts of the hazards of nature, the hurricane, tornado, seismic sea wave, and floods.

The effects of the oceans are ubiquitous. In one sense, this is what ESSA is all about. It is the national focus for environmental monitoring and prediction. It maintains unique and farflung observational networks on land and at sea and in space.

Through its forecast centers, such as its National Meteorological Center, its National Hurricane Center in Miami, its National Tsunami Warning Center in Hawaii, its National Severe Storms Forecast Center in Kansas City, and its operational meteorological satellite system with its global coverage of weather conditions on a 24-hour-a-day basis, ESSA works to detect and give warning to the Nation of the hazards of nature.

Internationally, a major effort is underway to monitor fully the global atmosphere and oceans. The atmospheric system is called the world weather watch. There is also emerging the oceanic counterpart, the integrated global ocean station system (IGOSS). These systems are being coordinated through the joint efforts of the Intergovernmental Oceanographic Commission of UNESCO and the World Meteorological Organization.

When viewed in conjunction, the world weather watch and IGOSs truly form the foundation for a global environmental monitoring and prediction system.

ESSA has been assigned the national lead responsibility for the world weather program by the President. The planning stage for IGOSs is getting underway, and ESSA is contributing, nationally and internationally, to this effort.

We believe that the recommendation by the Commission that the proposed national environmental monitoring and prediction system (NEMPS) should be planned and developed on a global basis in concert with the world weather program has much merit. This has been proposed to assure a well-coordinated and nonduplicative global ocean-atmospheric monitoring and prediction system.

One of the critical components that will be required for NEMPS, in the judgment of all who have looked at the need to acquire global observation of both the oceans and the atmosphere, is an operational environmental satellite system capable of global measurements as well as capable of interrogating platforms either in the oceans or the atmosphere.

Over the past 10 years ESSA and its components have developed, in collaboration with NASA, a capability unique among Federal civil agencies. We are the only civil agency responsible for the management of an operational satellite system. This weather satellite system has yielded remarkable new assistance in forecasting the weather for data sparse areas over the oceans as well as the land.

In the last 3 years since the formation of ESSA, we have moved to broaden the capabilities of this operational satellite system to encompass a wide spectrum of environmental measurements. In addition to weather measurements, we will shortly be using our infrared measuring devices to map the global sea surface temperatures.

This demonstrated capability on the part of ESSA would be indispensable for successfully carrying through the concepts of the proposed national environmental monitoring and prediction system.

The Commission has recommended a wide range of research activities needed to support such a system. I will not go into a comprehensive discussion of our related research on ocean current systems or the mathematical modeling of oceanic circulation, but I would like to comment on the Commission's recommendations for the study of air-sea interaction processes.

We believe that ESSA should continue to give high priority to air-sea interaction research and use its capabilities in cooperation with other Federal agencies, universities, and foreign scientists to mount needed major field experiments. ESSA was assigned such lead agency responsibility for Federal air-sea interaction programs by the Federal Council for Science and Technology.

The Barbados oceanographic and meteorological experiment (BOMEX), the largest and most complex experiment of this type ever undertaken, is an excellent example of interagency cooperation in the pooling of resources so as to accomplish a task that no single agency could undertake alone.

We in ESSA are confident that the experience gained from BOMEX can be applied to similar experiments in other areas.

In any national move to explore and develop the seas the sine qua non will be an adequate description of the physical and geophysical characteristics of the ocean floor. We must map and chart not only the areas adjacent to our shores but also the deep ocean. ESSA, as the civil focus for ocean mapping and charting, sees this as an urgent first step.

ESSA annually distributes more than 2 million nautical charts, of which nearly 300,000 are small craft charts for boatowners. ESSA now provides over one-half of all its nautical chart products to the Navy.

ESSA has begun the systematic mapping of the deep ocean and has mapped over 1 million square nautical miles in the North Pacific. To accomplish these mapping and charting tasks, ESSA-Coast and Geodetic Survey operates a fleet of 14 modern vessels from marine centers on the Atlantic and Pacific coasts and two aircraft.

At the present rate of effort our mapping and charting activities, extensive as they are, are almost overwhelmed by the present and growing needs for our products. We have not been able in the past few years to meet the national needs for adequate maps and charts of the oceans.

The Commission has accurately highlighted the problems and needs of ESSA to insure up-to-date charts of the U.S. coastal waters. Our present plans for additions to the ESSA hydrographic survey fleet and supporting facilities, particularly automated methods for data collection and construction of charts, need to be accelerated.

The Commission also has recommended that ESSA undertake the systematic mapping of the bathymetry and geophysics of the U.S. near-shore waters and the continental shelves and slopes in order to provide 1:250,000 scale maps of these regions within 10 years.

We are engaged in producing such maps. Our own schedule has called for a more moderate rate of survey to accomplish this task by the late 1980's. We have already begun both the production of maps from existing survey data and a program to accomplish the additional field surveys required.

I am pleased to report that ESSA and the Geological Survey, through joint field operations in Norton Sound, Alaska, have developed a cooperative mode of operation that can serve as the example for conducting the recommended bathymetric, geological, and geophysical surveys of our Continental Shelves.

The Geological Survey's capabilities in geological exploration complement our capabilities in bathymetric, geophysical, and oceanographic surveys. Together the combined capabilities provide for the

complete geological and geophysical survey of our Continental Shelves as outlined by the Commission.

There is one other service the Commission studied besides mapping and charting which ESSA now provides in part. This is the provision of environmental data services. The Commission has recommended that the National Weather Records Center (NWRC) and the National Oceanographic Data Center (NODC) be operated as a coordinated activity.

Steps have already been taken to improve the coordination between these and other centers for geophysical data. We expect that these steps will assist in satisfying the many user groups.

There are many more specific recommendations of the Commission that affect the Environmental Science Services Administration. I have only addressed the most immediate ones. In conclusion, I would like to emphasize that ESSA will enthusiastically participate in the implementation of any recommendations of the report of the Marine Commission which may be adopted.

Thank you.

Mr. LENNON. Thank you very much, Dr. White.

Mr. Mosher?

Mr. MOSHER. Well, gentlemen, this committee has heard it argued that it doesn't work in experience, it doesn't work to mix the administration of day-to-day action programs with the function of scientific research and development, and this has been one of the arguments we have heard against the creation of NOAA as perceived by the Commission, that in the administration of NOAA there might be so much emphasis on science and research that the day-to-day operations of some of the agencies involved would suffer.

I don't think this has been said before this committee, but I personally have heard it alleged that ESSA is an example of this. I have heard it alleged that in the last 3 years since the creation of ESSA, that some of the day-to-day practical operations that ESSA pursues, some of the coastal survey's data gathering work and the weather observations work, and so forth, that some of these practical day-to-day operations have suffered because of the scientific orientation of ESSA, in ESSA's top management.

Do you want to comment on those allegations?

Dr. TRIBUS. I certainly do. Dr. White and I will both comment on that. I would like to speak broadly on the matter and I would like Dr. White to speak specifically regarding ESSA.

It certainly does not have to follow that if you put research activities and operating activities together, that one is going to wash the other out. This is all a matter of the kind of management you have.

Mr. MOSHER. So that you would not say that is an important argument against the creation of NOAA?

Dr. TRIBUS. No; I certainly wouldn't use that against the NOAA concept. I think there are other arguments that might be raised, but I don't think that is a good one.

You will recall, Congressman Mosher, that when I testified before the Daddario committee I spoke at length on research and the management of research and development and ongoing operations, and I think in ESSA we have a very good example of how it ought to be done.

In the first place, all of the research in the atmospheric sciences is not concentrated in ESSA. The research is carried out in ESSA, but also research is funded by the National Science Foundation.

So, we see the principle that I spoke of at the Daddario committee being, I think, carried out properly there. The research is not centralized but ESSA is able to carry out its mission-oriented research and to engage in fundamental research and development which will lead to improvements in operation.

Dr. White can fill in some of the details but I am enormously impressed with some of the things that have come out of ESSA's research which have affected the operations, and I don't think they would have happened if they had been separated. For example, the Nimbus-3 satellite, which contains an infrared sensing system, is now producing data from around the world in places where we have not had the capability to make observations, particularly over the oceans, and this information is now being fed into the operating network, and the forecasts that we see on a day-to-day basis have been substantially improved by the addition of several thousand observations of upper air soundings where before we only had 600 or so.

You just have to have people who are in operations talking to people who are doing research, if the research is going to be relevant.

On the other hand, as I said, you also have to have an opportunity for people to do research on things that don't seem relevant at the moment the research is undertaken. I think if we were to take the entire budget of ESSA that is devoted to research, and throw it into operations, it would only amount to about 15 percent, and this wouldn't make a significant change in the overall capability of the operation compared to the loss we would sustain by not having this constant feeding-in of improvements.

Mr. MOSHER. You are saying that the danger that some other people before this committee have pointed to can be avoided simply by good management?

Dr. TRIBUS. That is right. That is a good point at which I should turn this over to Dr. White and have him talk a little more about the specifics of the management.

Dr. WHITE. I will be very brief, Mr. Mosher.

First, I have a general comment. I believe very strongly that unless research and development is closely responsive to the needs of operations and services, you will not get the maximum out of research and development, and, therefore, there are significant advantages to having a very close relationship between research and development activities and service activities.

Mr. MOSHER. In other words, it is an advantage rather than a disadvantage.

Dr. WHITE. In my view it is, sir.

Mr. MOSHER. If well managed.

Dr. WHITE. In my view it is, sir.

Secondly, with regard to your comment about whether ESSA's operational and service activities have suffered as a result of a concentration on scientific and research activities as against a concentration on service activities, this as I see it is just not true.

The problem is that both in our research and development activities and in our service activities, we have been under very stringent

budgetary constraints over the past 3 years and there has not been a shift in emphasis from services to research. There just has not been additional money being appropriated to improve our services in the manner which we would like. But this is also true of our research.

We carry out the programs that are approved by Congress through its appropriations process. Over the past 3 years the moneys that it has given us for research and development have been significantly lower than those that they have given us for our operating services. During these 3 years our requests to Congress for funds have similarly been heavily weighted in favor of services. We carry out the programs as approved by the Congress, sir.

Mr. MOSHER. Mr. Chairman, one other question, or comment.

Certainly, these gentlemen have presented us with a very impressive and perhaps optimistic outline of the activities and programs that the Department of Commerce already is conducting and intends to conduct in support of the many goals and priorities established by the Stratton commission.

Now, in presenting that impressive list of the jobs that you are already doing and your capacities to do these things, Mr. Tribus, are you implying that perhaps the Department of Commerce itself is the agency which might take the lead and coordinate this whole effort and obviate the necessity for the creation of NOAA?

Dr. TRIBUS. That is a very good question. As I said at the conclusion of my testimony, there were some aspects of this that it did not seem prudent for me to comment on now, and I think you are getting awfully close to the limits of prudence for me.

Certainly, we have a number of things going on which we think would make a good basis for an expansion of our activities to meet many of the activities that should be carried out under the NOAA concept.

How far one ought to go in that direction requires consideration of many issues that go beyond those that are put on my desk, and therefore I would like to say just at this point that you have correctly interpreted our enthusiasm for going into this area and for working in this area, but beyond that I guess I will have to wait until I hear from the decisions that are being made now in offices that are somewhat above me.

Mr. MOSHER. Okay, Mr. Chairman.

Mr. LENNON. Thank you, sir. Mr. Rogers?

Mr. ROGERS. Thank you, Mr. Chairman.

Mr. Secretary, it is good to see you and, of course, Dr. White, whom the committee holds in high regard also. We have had an opportunity to work with him.

I think what you have outlined as the activity of ESSA has impressed the committee. Since we have followed it over the years, they have done an excellent job.

Has the decision been made in the Department to oppose the formation of a separate oceanographic agency, independent?

Dr. TRIBUS. I don't think that would be a good way to characterize the position of the Department. The position of the Department, as the Secretary transmits it on up to the President, and I am not always there, of course, when he does this, is that we are ready to help in any way we can in this mission.

We think that the question of a separate agency is one alternative, but it is not the only way to meet it, and here are the capabilities we have to offer. Here is the best assessment we can make of what would result from various transfers. These are things that certainly must be in this agency if it is to do its mission. Here are things that are marginal for consideration.

And that is about where we would have to leave it, at that point.

Mr. ROGERS. I see. So, at least you have not come to a departmental position either in favor of or in opposition to a separate oceanographic agency.

Dr. TRIBUS. I think our whole approach has been to say that this involves things that go beyond the Department of Commerce. It has to do with the spirit with which the administration wants to organize, the effectiveness of various approaches, and then stop at that point.

Mr. ROGERS. Yes. Well, I commend you for that. I think at least you have not come out in opposition to a new idea.

Of course, as I am sure you know, the whole thrust of what we are trying to aim at is to put emphasis on the development of the ocean.

Dr. TRIBUS. Yes; and this is the point that I have tried to make in this testimony: that is, to develop a civilian activity in the ocean that contributes to the economy. It goes without saying, that a lot of private investors must be encouraged to go into the ocean and spend their money to do something because they think they can provide a service and make a profit.

Now, the fostering of that activity requires that the agency that does it have the capability of dealing with industry in such a way as to bring this about. Such an agency should not set itself up as an agency that is going to start all over again and either learn how to do economic development or assume somehow or other that economic development will occur over there somewhere without their active participation.

Mr. ROGERS. Well, I see the point you are making, but I must say I have some concern when I look at the American merchant marine and what has happened to that.

Dr. TRIBUS. Yes; I think you have a right to be concerned.

Mr. ROGERS. Perhaps a new agency with new, fresh ideas, not impeded by the formula of asking so much for this activity and not where they have such timidity in asking for sufficient funds to do the task, maybe this is what we need, and I think the Commission thought that.

Dr. TRIBUS. Yes. That is a way to go at it, but it is not the only way.

Another way is to say, "We have a good beginning in an agency such as MarAd, and now let's build it into what we want," and this is what the present administrator is doing. I think his program at the Woods Hole Conference is very imaginative.

I didn't mention in my prepared testimony the work that is going on with the surface effects ships program. This is very impressive. There is a lot of new activity going on.

Mr. ROGERS. I am sure that is so, and this has come about in the last 5 or 6 months, but in looking at the history of the development, it is not too impressive.

Dr. TRIBUS. I tend to agree with that.

Mr. ROGERS. I am concerned, too, at this. For instance, what is your construction budget for ESSA? Is it \$3 million?

Dr. TRIBUS. I don't have that offhand. Just a moment. I will get the information.

Dr. WHITE. The fiscal year 1970 budget had about \$3 million for construction items in our budget.

Mr. ROGERS. Here is an agency that needs to build some laboratories, needs to build facilities, and I hope that you, Mr. Secretary, will impress your Secretary and the head of the Bureau of the Budget that ESSA's construction budget, for instance, is vital in the knowledge on hurricanes.

Here we just had Camille, where it would have been helpful if we had an accelerated program in being able to know more, and we have a program trying to get started in Miami on this, and now they are talking about delaying again the building of your laboratory. But I don't hear anybody in Commerce saying, "These are essential things for this Nation to do."

This is just an example of what I am talking about. We have to have someone to speak out and not just put it in a category of "Well, we are talking about it and we are planning about it."

This is what this Nation has been doing for the last 20 years. We want to see someone come out and do something and say, "We not only are going to plan and we are doing the planning, but we are going to have some action."

That is what I think this committee wants and is concerned with. I understand your feelings and I think you make some very legitimate points, but I am not sure that this gets to the root of the problem in that we want something new to come forth and with great vigor and vitality to excite this Nation as to what really is in the oceans for the economic development of our people.

Dr. TRIBUS. Let me speak to that point, because I think sometimes the achievements occur and they are not related to some of the spectacular things that are said.

I was in Miami the other day and I was much impressed by what I saw in the development of oceanographic activity along near where the University of Miami has its facilities. Now, one of the ways that came about is the decision on the part of ESSA to consolidate various kinds of its research activities and put them near a university so that there would be encouragement for the university to put different activities together.

The Bureau of Commercial Fisheries is down there and this provided a nucleus, and then the people down in Miami got busy and they started promoting. I think after a while you are going to see a lot more activity out of these rather quietly made decisions, as quietly as could be made, because it is enough trouble to figure out where to put a laboratory without making too big a thing of it.

Mr. ROGERS. It was not too quiet, I might add. I was very aware of it.

Dr. TRIBUS. What I am getting at is that the seed effect of this is enormous and in terms of budgetary implications it goes far beyond coming to the Congress and asking for several millions more when you see what happens in the private sector.

Let me give you another example of what I mean. In the special task force that I am heading, where we are looking into our capability in the ocean, I am very much impressed when the people from Ocean

Science and Engineering tell me that they joined together with Alcoa to put up \$5 million of their own money to make the *Sea Probe*, or when the people at Westinghouse tell me they built the *Deepstar* with \$20,000 of their own funds.

Mr. ROGERS. And their Ben Franklin, basically on their own funding.

Dr. TRIBUS. That is right. And when I see what Ocean Science and the Fluor Corp. have done together to develop a new approach to an oil rig to take them to 2,500 feet when the record up to now is 340 feet, that is a real achievement.

I ask these people:

What do you need to get on with your business? What do you need from the Government?

I am quoting now. They say:

We need better weather prediction. We need better prediction of the sea state. We need better and more extensive mapping and survey of the ocean bottom.

We need agreed-upon standards for the measuring system. We need agreed-upon techniques of measurement, because we rely on other people's measurements, and we don't know what they mean because they haven't taken them in a standard way. That is what we need help on.

Then they say to us, quoting again:

We find it easier to contract with developing countries for offshore activities than we do with the United States because the institutional arrangements are such that it is harder to deal with the States.

What I am getting at is that quite often the thing that needs to be done to promote development is a lot less spectacular sounding than some project for which you ask for umpteen million dollars and promise to do great things.

The things that are required to cause the flow of private capital are often not so spectacular, but equally important, and that is why in my testimony I emphasized these things we were doing. I didn't make a fuss over the surface effects ship. I didn't make a fuss over the things we have done to promote containerization.

The emphasis in the Maritime Administration today is on the use and deployment of technology to get us out of the position where we are merely funding the building of minor variations of ships that already exist and get the American shipping industry into the ships of tomorrow.

Mr. ROGERS. Yes. I don't see much application from the *Savannah*, though. You mentioned the *Savannah* briefly, and I haven't seen much come out of the *Savannah*.

Dr. TRIBUS. Well, there are two or three things that can come out.

Mr. ROGERS. Can, but haven't. This is what I am talking about.

Dr. TRIBUS. Well, we are talking about the new team that we are putting together in MarAd, and what you are saying is you don't believe in the new team because the old team did not do a good job.

Mr. ROGERS. I would say I am more prejudiced that the new team won't do as much as they might have because of the old team. Maybe that is what I said.

Dr. TRIBUS. Give us a chance. We have a lot of programs.

Mr. ROGERS. I am willing to give you a chance and I hope you will. Of course this committee will cooperate and I am sure the Congress will, in doing everything we can.

I don't want to impose much longer on the committee's time. I realize that the new team must be given time, and properly and certainly will be given it, and I was hopeful that the new team would come in with such a fresh idea that they would say:

This Commission has studied the problem set up for a two-year study. It has gone into this and recognized that we need a new organization and we are willing to go with them.

rather than taking the old team's attitude of saying:

Well, we better keep everything in these departments just like they are.

So that I hope the new team will come in, and I think your Department is beginning, I hope, to move in the area of a fresh idea, to say:

Well, if it is the best thing for this Nation to have separate organization, we will go for it.

I think you are saying this to me, or I hope so. Are you?

Dr. TRIBUS. Yes, but let me give you some evidence to help you have more confidence in the things I have said. We have already released a program by MarAd for a standardized multiship program.

Mr. ROGERS. What is your budget request to the Congress?

Dr. TRIBUS. I don't have that number.

Mr. ROGERS. Well, I think you will find the budget request is less than this committee approved, much less, and much less than the Senate approved.

This is the point I am making, that of course I realize there are many implications. I want some emphasis placed in the area, and I know you do too. What we need to get, is some action. Instead of always talking about planning and what we are going to do in the future, we need some action and that is what this committee is interested in.

Your testimony has been most helpful, Mr. Secretary, and I appreciate it and I think your attitude has been more encouraging than that of other Departments. Thank you.

Mr. LENNON. Mr. Schadeberg.

Mr. SCHADEBERG. Mr. Chairman, I apologize for being late. I was unavoidably delayed. It would be presumptuous for me to ask any questions because I did not hear the presentation.

I yield my time.

Mr. LENNON. Mr. Downing.

Mr. DOWNING. Mr. Secretary, I was at another committee and didn't listen to your testimony. I have read it, though.

When do you think we could expect the views of the Department of Commerce on this matter of a proposed NOAA?

Dr. TRIBUS. Well, I am not sure quite how to answer that question, because the views of the Department regarding NOAA to a very large extent are contained in my testimony. The only area in which we have not felt free to be quite explicit has to do with organizational aspects, because we are making recommendations and comments to the administration, but until the pros and cons of the various organizational problems have been resolved, it does not seem proper for me to make those available.

Mr. DOWNING. I didn't ask you what the position was, but when are you going to let us know what your position is?

Dr. TRIBUS. I really cannot answer that question. I wish I could. I don't know the answer to that.

Mr. DOWNING. Your statement says, "It may not be the best vehicle for the Nation's effort in the marine environment."

Let me put it this way. Will we have somebody tell us what the position of the Department of Commerce is, or will we just go on willy-nilly?

Dr. TRIBUS. Well, if you are asking me whether you are going to get a departmental position which is separate from the administration position, I guess the answer to that is that that does not seem to be the way we ought to do it, and I don't think we will.

I think it is proper for us to defer to the President in this matter, as to what his wishes are. He and his associates are actively studying and I look forward to hearing the result.

Mr. DOWNING. I imagine that the President will ask for recommendations from you.

Don't you think so?

Dr. TRIBUS. Yes. He will ask for comments from us. We have commented on the various alternatives.

Mr. DOWNING. I sort of hoped that we would have some statement from the Department of Commerce.

Dr. White, while I have you here, in Camille was there any way of predicting that Camille would dump 31 inches of water in 5 hours over the northeastern section of Virginia?

Dr. WHITE. Our present knowledge of the ways in which precipitation occurs and the ways in which these storms work would never have allowed us to predict an amount of water of the kind which was dumped by Camille on Virginia in a very, very small area. Some of the readings there indicated that amounts of 27 inches fell in a 12-hour period, far exceeding anything on the record in that area.

There have been one or two occasions in the record in other parts of the country and other parts of the world with the intensity of down-pour exceeding that, but this was most, most unusual and anomalous, and my personal assessment is that the status of our science is such that we could never have predicted that amount of precipitation.

Mr. DOWNING. Thank you, Dr. White.

Thank you, Mr. Chairman.

Mr. LENNON. Thank you.

The gentleman from Oregon, Mr. Dellenback.

Mr. DELLENBACK. Thank you very much, Mr. Chairman.

I join the other members of the subcommittee in welcoming you, Mr. Secretary and Dr. White.

I have listened carefully to the testimony that each of you has given, and, Dr. Tribus, I have read carefully also the testimony that you have given, and I am not really sure that I understand the nature of your expressed concern about NOAA, because after commenting on the background recommendations and what is being done in Commerce, you end up making a comment on the Commission's report in saying:

I have serious doubts as to whether the Commission's recommendation to establish NOAA is, in fact, the best organizational method for marshalling our national efforts in the oceans.

Then you devote one paragraph at the bottom of page 12 of your

testimony to the objection to the proposed NOAA, and make a comment on the study which is going forward.

I would like to get at the reasons why you apparently have some concern about NOAA as the best instrumentality. Is it because you feel that the elements which it is proposed have their efforts coordinated, which are listed at the top of page 12 of your testimony, namely, the Coast Guard, the ESSA, the Bureau of Commercial Fisheries, the national sea-grant program, the U.S. Lake Survey, and the National Atmospheric Data Center, should not be coordinated?

Dr. TRIBUS. Oh, not at all. I think the concern goes more along the line of what I spoke of earlier. That is, that we are concerned with the development of a capability in the ocean that involves more than just the U.S. Government. It involves the encouragement of industry to participate, to develop activities.

A separate agency which is not primarily oriented to the development of the economy is going to find it somewhat more difficult to fulfill its role.

I am not saying it is impossible. I am not saying a separate agency is an impossible way to do business. It may well be a way to do it. I am just saying that when you shift your focus from saying, "There is that big ocean, let's all get in it and do things," to, "There is that resource that needs to be developed," and if you think of the total development processes not just the science and technology, but the science and technology plus financing, organization, personnel, the development of viable enterprises, you may shift your sights a little bit, and when you take that into account, a separate agency may not be the best way.

But I am not saying that it is an impossible way, or that there is something inherently wrong about it. I am just saying there are more alternatives to be considered.

Mr. DELLENBACK. Would you then please make a brief comment on what alternative you personally feel would be superior to this centralized agency?

I recognize that Mr. Mosher's earlier question was reaching in the direction of the Department of Commerce. I think this is no time for modesty on your part. I would like to know what your opinion is since you are one who is deeply involved in this field, because I really don't understand whether you are being delicate and modest, or whether you are really saying to us that you don't think it ought to be coordinated in a single agency.

I would like to know, as one member of the subcommittee, what you are saying.

Mr. TRIBUS. I am awfully glad this is on the record. Very few times in my life have I ever been accused of excessive modesty.

I would like to consult with my attorney here for a moment.

Well, I am afraid that the best I can say now is that we can consider hypothetical cases of various sorts, but I just don't want to get into the position of discussing what this administration ought to do, because I think that takes on matters that go beyond my province. I don't like the people who work for me usurping my authority, and I don't want to do this to the people above me.

Mr. DELLENBACK. Please, Mr. Secretary.

Dr. TRIBUS. Within that limitation, let me make a few comments concerning alternatives, and their pros and cons, and I can perhaps get at what you would like to hear from me.

Mr. DELLENBACK. Please let me make my question clear.

I am not seeking to embarrass you. I am not seeking to embarrass the President. I am not seeking to embarrass anybody about this.

I am just deeply concerned about this problem, as are other members of the subcommittee, so that we are reaching for ideas.

Here is a specific suggestion which has been made, I suspect not a perfect suggestion, i.e., the creation of NOAA. If we are going to abandon this proposal which has been recommended by a very, very prominent Commission, I would like to know what alternatives there are available.

Dr. TRIBUS. Let me make some statements relative to that, which I hope will be helpful.

We have already said in our testimony that ESSA is an essential part of a NOAA concept. We have not said in the NOAA concept where it would be, which I think by implication means, however, if a NOAA is set up, if we mean business about the NOAA mission, and the missions as I have defined them, then it necessarily includes ESSA. That is clear.

If someone decides that there is going to be a separate agency, and if that separate agency is really separate, then I suppose the Department of Commerce has lost ESSA, but if that is what it takes to do this mission, that is what it takes. All right.

We attempted to go through the list of organizations that are essential. Some are more essential, and some not so essential.

Let us take the program which Interior has in the Office of Saline Water. I think no matter how you examine that, that could or could not be in a NOAA, or whatever we are going to call this agency.

It is clear that you could look at that in several ways. On the one hand, it does have some impact, perhaps locally, on the seacoast, on the sea, with the intake of water and exhaust. It has a lot of materials problems.

On the other hand, it really is a power problem, and a water problem, and perhaps ought to be looked at more in terms of the fresh water supply of the Nation, and perhaps it belongs more in Interior than it belongs in NOAA.

What I am talking about is that we have to go point by point to every agency that is proposed for transfer, and ask some hard questions about how essential are they to the NOAA concept, and what impact they would have on the other programs to which they relate.

Now, it is in that context that I have hesitated to say exactly how it ought to be, because as soon as I start talking about our programs, and other people's programs, you known as well as I do the implications of such remarks, and I am just simply trying to stay away from them until the decision has been made at a higher level.

Mr. DELLENBACK. Again, I am not seeking to force a recommendation from the Department of Commerce, but I am interested in at least knowing the theoretical objections to the NOAA concept.

You have indicated, as I read your testimony, that you do not feel that these various elements which would embrace at least those listed at the top of page 12 of your testimony should be kept separate and independent each from the other. Is that correct?

Dr. TRIBUS. No, I think there has to be a way of coordinating this, and I think some things will have to be put together.

For example, MarAd was ignored in the Commission report. There is no ship organization included.

Mr. DELLENBACK. Is it your opinion that that should be?

Dr. TRIBUS. Yes, I think they have to be put together.

Mr. DELLENBACK. Are there any others like this that you feel should be put together?

Dr. TRIBUS. You can go both ways. It is not clear what the role of the Coast Guard ought to be in this, because on the one hand they are an agency whose ships carry armaments, and they do have a police force activity.

It is going to take a lot more study to decide whether you can get better international cooperation in research and development if you carry this out with an agency that is also doing police work.

Maybe that has to stay where it is, but be coordinated in its activities and use.

For example, ESSA has now the lead agency responsibility in the buoy program, but Coast Guard, because it has the ships and the people, carry out a portion of it, and it may well be that we will discover as we explore the activities that the NOAA employs—as we explore them in detail, we are going to find that certain things may be pulled together in one agency, or through some special type of coordination, and at this moment those are the matters that are under review.

That is why I am again hesitant to say exactly how they ought to be.

Excuse me. I was in error. The Coast Guard has the lead agency responsibility, and we coordinate, which means we state the requirements, and of course that information is put into our computers for the forecasting, so we obviously have to say what it is we want out of the buoy system, but the Coast Guard deploys them, maintains them, and services them, and so on.

But you can see that there are issues here that are not simply organizational, but they have to do with matters that the Commission probably did not have time to go into.

I think they have done a magnificent job, but they still could not do everything.

Certainly the MarAd is one question. Another is the question of whether you can have an armed force type group and go out and say: "This is a research agency, and we want to engage in friendly research with you." There is an application there that you have to work your way through.

Mr. DELLENBACK. On this question of independent agencies whose efforts are coordinated versus a single agency, which would be the agency primarily responsible for the operation of component elements, do you feel that it is not imperative that they be kept independent, and merely have their efforts coordinated, but you are not prepared to say, because of individual constituent agencies, that they should be blended together in a single organization? Is that correct?

Dr. TRIBUS. I think I would say it a little differently, but it is almost what I am saying; namely, that just coordination of things as they stand now seems to be a pretty difficult task.

Mr. DELLENBACK. So you would go beyond coordination?

Dr. TRIBUS. I certainly would go beyond mere coordination, but the question of where this agency reports, and all that it includes, it seems some still is open to question.

Mr. DELLENBACK. But you would go beyond the present interrelationship between independent agencies which merely share information?

Dr. TRIBUS. Yes.

Let me say one of the reasons for that. It just has to do with whether you get a critical mass, whether you have enough things going together.

I have been reviewing this as part of this task force on national programs. As part of that work, every agency in the Federal Government that is doing anything in the ocean is presenting its program.

Now, you listen first to the Navy present its program, and there is a real powerhouse of engineering talent. They present the things they are doing, and you see how they have studied their needs and requirements, and are then going back to make sure that the basic research and development is adequate to enable them to carry out their various missions.

Then you have a report from MarAd, and it is a pretty good report, but not anything like Navy, because MarAd is down in numbers of people and dollars.

When you talk to other agencies about their programs, the only word that I can use, and the most charitable one, is pitiful.

We really have to do more, and bring this expertise together. As an engineer, I am worried that good judgment comes from bad experience.

I am worried about where that good judgment is now being stored. When you go to make an improvement in a ship, you go where there are people with a long history of involvement with the equipment, and with the facilities, and with the procurement problems, and with the labor problems, and all the rest.

I think we have to pull our efforts together to be able to consolidate our lessons, particularly in the development of technology. I don't question that. The only question I have is where this should report, and how it gets its funding, and its relations to others.

Mr. DELLENBACK. I think that is extremely important.

Dr. TRIBUS. Yes, sir.

Mr. DELLENBACK. You are then emphasizing the vital importance of improving the presentation and bringing together a much more cohesive organization to blend together actions and available data, et cetera. Is that correct?

Dr. TRIBUS. Yes, sir.

Mr. DELLENBACK. And you feel it is important that there be a blend of the operation of Government and the operation of private industry?

Dr. TRIBUS. Yes, sir.

Mr. DELLENBACK. And you feel it is important that there be a blend of the operation of research and the operation of application of research?

Dr. TRIBUS. Yes, with the one limitation that not all the research should be funded out of this agency in order to provide the multiplicity of approach.

Mr. DELLENBACK. Then if we include this vastly improved coordination of operation, that is one goal, if we include the goal of blending of research and application, the goal of blending of Government and

private sector operation, and if we assume as another important goal a method of getting major, substantial, increased emphasis on all of this, you would accept these as goals?

Dr. TRIBUS. Yes.

Mr. DELLENBACK. And you are not saying that the creation of an independent agency could possibly not be the best way to bring about these goals. You stop short of saying that that is the best way of reaching these goals.

Dr. TRIBUS. I am not sure when you throw enough negatives together what the affirmation is.

Mr. DELLENBACK. Do you accept those as the goals?

Dr. TRIBUS. Yes.

Mr. DELLENBACK. Would you add any other goals as desirable goals?

Dr. TRIBUS. I guess I would have to. As you went down the list, I think it was an exhaustive list, but I may not have caught everything. But you seem to be hitting the principal lines and I agree with those.

Mr. DELLENBACK. Those would be major goals. You might have some peripheral ones.

Dr. TRIBUS. That is right. There are areas of manpower, for example. If you are going to have an industry that is centered around the ocean, you are going to have to produce people to get into it. In your remarks you did not speak to the issue of encouraging the development of research and development in education to support this activity.

If you are going to introduce change in industry, you have to come to grips with the fact that change involves the workingman and you have to deal with him. That was an issue that it seems to me needs to be brought out.

I am not so sure, because I just don't remember whether you put in your list the same emphasis I would on the need to develop the economic ties so that you create viable industries as opposed to creating something that has to be continually subsidized.

But the main thrust is that to do this will require something stronger than the coordination of a group of Federal activities spread thin across the Government.

Mr. DELLENBACK. Excellent, and it will also require major change, then, over that which is now existent, forgetting for the moment what form the change will take.

Dr. TRIBUS. I don't know how major it would turn out to be because in many cases we are talking about adding things that don't exist now, and if addition is change——

Mr. DELLENBACK. Addition is change.

Dr. TRIBUS (continuing). Then of course it is. There will have to be major additions if we start to do all of these things. There is no question in my mind that, as I said, the engineering capability outside of the Navy, and certainly if you don't include MarAd, can only be called pitiful.

We have to do a great deal more. That is an addition. In many cases, I think, if you take existing operations and group a few of them and then fund them and add the people, the result will be as though it had been a major transformation, when in fact it may not be.

Mr. DELLENBACK. But insofar as results are concerned, you think there should be a major transformation from that which is now existing.

May I ask one more question, Mr. Chairman, and then I will stop? I don't know whether you really want to speak directly to this question or not, Mr. Secretary. Let me ask it.

As you evaluate the relative national and international importance of major steps in the field of the oceans and the atmosphere versus major additional steps in the field of space, how would you evaluate these from the criteria of national and international importance, one in relationship to the other?

Dr. TRIBUS. This is an extremely difficult question to answer. I think I tend to agree with Dr. Paine, who has said that in many things these just aren't comparable.

There is, first of all, the whole question of our approach in this country to spending money. Sometimes we make investments and sometimes we spend money, and it doesn't seem to me we always distinguish between them.

Sometimes we proceed toward goals which have a quality that everyone agrees it's a good thing to do because that is just in tune with our character. Other time we do things which people don't even know that we are doing which enhance our economic capability. I am not ducking your question entirely, but I find it an extremely difficult one to answer simply because it seems to me that there is implied here an either-or quality which I am not sure is essential or is inherent in the situation.

Some of the things we can do have a multiplying effect. A certain amount of money spent in standardizing instruments, a certain amount of money spent in mapping and charting may produce enormous dividends.

Then in the space program it may be that you have to spend a lot of money before you realize your dividends.

Certainly what is going to happen to this Nation in the field of communications, what is going to happen in better monitoring in the atmosphere that has come out of the space program in many ways is going to be extremely difficult to calculate.

I am sure we are going to get breakthroughs with respect to meteorology, particularly with respect to things like the hurricane which would be impossible without our weather satellite, and we wouldn't have had our weather satellites without the space program.

So that, in a certain sense, we are talking about a program that is very expensive in the space program but which has potentialities which boggle the mind, and then we talk about another program which is of lesser order of magnitude of expense which has return which is significant, and at this point I am just unable to make a good contrast.

Mr. DELLENBACK. Thank you.

Mr. LENNON. Mr. Karth.

Mr. KARTH. Mr. Chairman, Mr. Secretary, contrary to what some of my colleagues might imply, I am encouraged by your testimony. I think I agree with you. You are not excessively modest.

Dr. TRIBUS. I am glad you qualified. Thanks for that, sir.

Mr. KARTH. I would rather suggest that you are one who gives very serious consideration to the definition of the word "authority" and the responsibility that goes with it insofar as it relates to judgments made or not made at this point by those who are superior to you in the echelons of Government.

The reason I say I am encouraged by your testimony is because of what you have not said. The Commission report is the best proposal that has been made up to this point, and I think most thoughtful people agree that it is the best approach that has been suggested to date.

Years hence and in retrospect it may not have been the very best, and I think over a period of time we will make some modifications.

I might just digress momentarily and say that the language you used on the last page, and I will quote, "It may not be the best vehicle for the Nation's effort in the marine environment," doesn't really bother me because you are saying, "It may not be the best program." So that statement is a very cautious one.

I don't think it is a negative one at all. Again I say that I was encouraged because I think the rest of your testimony is rather positive in nature.

I think theoretically your statement does support in great part the Commission's recommendations pertaining to an NOAA agency.

I was encouraged, Mr. Chairman, also because the Secretary feels so strongly that research and development moving along together has many advantages over research and development moving along separately, particularly when they are separated by agencies of Government.

NASA, I think, is the best illustration of what fantastic success you can have with this. Never in the history of our country has major research and technological development and progress been so successful, particularly when none of their programs had ever been done before by man in all of our history.

That is because the research and the development went hand in hand, the people who did the research followed through and also carried out some of the development. They didn't have to talk to different people. All they had to do was to continue to pursue what they found during the course of their research activities throughout the development of the program.

Well, I agree with you. I say that is the reason I am encouraged.

I might say to my colleague, Mr. Dellenback, that because of what you said, Dr. Tribus, I think that for all practical purposes you have given indirectly at least an endorsement to the Commission's report.

I am not going to ask you whether or not that is true. I am not even going to ask you to comment on that statement.

What you have said relating to research and development moving along simultaneously, side by side, within one agency under the same authority and good management, I think pretty much does what we are asking you to do, beyond which I am confident you cannot go at this time or possibly even in the future.

But I want to thank you very much for your testimony. I find it most encouraging, and I think you have done a yeoman's job here in convincing this committee that they are on the right track. Thank you.

Mr. LENNON. I thank the gentleman from Minnesota for the comment, and I thank the gentleman from Oregon for the very precise, incisive questioning that developed the testimony on which the gentleman from Minnesota is able to make those comments.

It has contributed a great deal. It is certainly obvious, isn't it, Mr. Secretary, and Dr. White, that if there is such a Central Govern-

ment structure as NOAA brought into being, that ESSA would be an essential and necessary part of the same?

Dr. TRIBUS. I think that is true.

Dr. WHITE. Yes; I would agree with that, sir.

Mr. LENNON. Now, in the testimony of last week by the Under Secretary of Transportation he was talking about the Coast Guard and the reasons for the Coast Guard being in the Department of Transportation, because it was related to transportation, and the question was asked in what manner, in what way primarily was it related to transportation, and of course he immediately replied "The Maritime Administration."

We couldn't help but comment, "Now, you justify the Coast Guard being in the Department of Transportation because of its relationship to the Maritime Administration, but the Maritime Administration is not in the Department of Transportation. It's in the Department of Commerce."

Then the question was asked by me, "Would you gentlemen like to see the Maritime Administration moved over into the Department of Transportation?" And you know what the obvious answer was, human nature being the same.

So we find ourselves in these situations so frequently.

I have been privileged to read over your statement, Mr. Secretary, prior to coming to the meeting, and I have questions, but I think most of them have in substance been answered. Time will not permit us to go into any great detail of them this morning.

The question was asked as to whether the time will come that the Department of Commerce would make a specific recommendation or submit a definitive alternative to the Commission's recommendation.

I am reminded that back in 1961 when the Honorable George Miller was chairman of the Subcommittee on Oceanography and it had just come into being a couple of years before that time, this being the 87th Congress, the first session, there was legislation introduced oriented in the direction of some of the Commission's recommendations with respect to a Government structure.

I was reading again this morning to refresh my memory a letter received by me in January of 1962 which was the second session of the 87th Congress, signed by the then acting chairman of the Subcommittee on Oceanography, Mr. John Dingell, in which he pointed out that the committee had wrestled with this problem all during the first session of the 87th Congress, more specifically calendar year 1961, and expressed the view as to whether or not we could ever get the administration to go along in bringing together the various spectrums of oceanology, marine science, oceanography out of the 11 departments and agencies of the Federal Government.

To make a long story short, we were unsuccessful.

Now let's assume that the administration had supported this committee in its efforts to make a start then. There is no doubt but what when ESSA came into being it would have moved into this agency, the central agency.

Where would we be today if the committee had not met with the resistance of the administration in our efforts to take some forward step in this field?

So then we came back after many years and brought into being the act which mandated the Commission. We didn't say "find and recommend a Government structure." We said: "If there is a need for a Government structure, will you tell us so, and if you make the determination that there is a need for a Central Government structure, indicate and tell us what type of Government structure.

Now, why should we just continue as we have in the past having this lack of dialog with the administration? You perhaps don't know it, Mr. Secretary, but Dr. White knows, that even when the act was passed and enacted into law creating the Commission, we felt the necessity at that time to create a national council because it was obvious to us from testimony that the Interagency Committee on Oceanography did not have the sufficient policy-level height necessary to be a determining factor in making these decisions related to the various Government agencies that were involved.

We met the resistance of the administration on that, too, but we went ahead anyhow and said nothing can be lost and everything can be gained, and it was embraced by the administration when it came into being as the best thing that could ever happen.

As early as February of this year the President called on the Vice President as the chairman of the National Council to make some general recommendations in this field, and the Vice President went to the agencies and departments for their comments.

But what I am concerned about is that the President called on the Ash Commission on May 19, on May 19 and today is September 23, and the Ash Commission is not even organized yet and doesn't have a staff, and on the 11th of September of this year they so advised us that within the next month or two that they hoped to be able to launch this study, within the next month or two.

Yet it was on the 19th of May of this year, and we have it in our file, and it is in the hearing record, that we had the President's request to the Ash Commission.

We assumed that they would be in position to give us some general ideas. We called them on September 10, and they responded the next day, and said, "We hope to launch a study within the next month or two. After we get into the problem, we will be in a better position to estimate how long it may take."

In other words, it will be 2 months before they get ready to start to begin to commence a study, and at that time perhaps they can estimate how many more months it would take them to review the Commission's report and make their recommendations.

Now, that in somewhat discouraging because that is the experience we have had in the past.

Both Mr. Mosher and I were privileged to meet occasionally with the Commission, although we had no part in the decisions except to try to point out to them what was the congressional intent based on the hearings in this committee room and based on the statements made on the floor, and we participated to that extent.

Appropriately Dr. White refrained from participating in the decision of the Commission with respect to a Government structure. I don't know what he might say if he disassociated himself with the administration as the Under Secretary of the Navy has done since

being a member of the Commission, and he now wholeheartedly endorses the concept.

Of course the Navy is not involved. I realize that. There again you have the human element.

I do appreciate your testimony. I agree with the gentleman from Minnesota that you have given us some encouragement, and I am so grateful for the very incisive way that you were examined by the gentleman from Oregon to develop these things.

I am much more encouraged than I was by the testimony of the distinguished Under Secretary of the Department of Transportation. But there again the Coast Guard is the biggest part of the Department of Transportation, I guess, when it comes to manpower, and budgetary funding, too. We can expect that. We do appreciate it.

The gentleman from Massachusetts. I am so glad you are back. You may proceed.

Mr. KEITH. I was on a provincial mission.

Mr. LENNON. Do you want to give us a report?

Mr. KEITH. Jimmy Burke said that there were 22 members of the Ways and Means Committee that had shoe manufacturing establishments in their districts.

Mr. LENNON. I thought you were going to tell us that you had been down there to talk about this.

Mr. KEITH. That will come at a later date. I am sorry that I couldn't be here, but I have a case in point which underlines the philosophy expressed by the chairman.

In what agency is the national buoy program now?

Dr. TRIBUS. Dr. White will respond to that.

Dr. WHITE. The Coast Guard is responsible for the development of the national buoy program.

Mr. KEITH. In what agency does the Weather Bureau function?

Dr. WHITE. The Department of Commerce.

Mr. KEITH. If NOAA was in existence, would not this be a means of liaison? Would this not be much more effective than to have these responsibilities dispersed?

Dr. WHITE. I would not want to leave the impression, Mr. Keith, that we do not have very good coordination on the buoy program with the Coast Guard today. It is excellent. They are responsive to all the requirements of all the Government agencies.

On the other hand, I also could not honestly say that if they were in the same agency such coordination wouldn't be very much simplified.

Mr. KEITH. We had, as you know, a hurricane a couple of weeks ago which prompted, once again, please on the part of Members of Congress for a weather ship which would keep track of these storms. They cause millions of dollars of loss from what you might call false alerts, people closing their stores and so forth because the hurricane was lost, because we lost track of it.

It is the opinion of a great many people at the Weather Bureau that a weather ship would make this job much easier, that is, keeping track of the hurricane and the forecasting of the weather in that area.

Now there is a buoy program that has an ability to function to a large degree in the same way as the weather ship. Are you familiar with that buoy program?

Dr. WHITE. Yes, I am, sir.

Mr. KEITH. They have a monster buoy up about 40 feet in elevation.

Dr. WHITE. Forty feet in diameter, sir.

Mr. KEITH. And how tall?

Dr. WHITE. Well, that can go to various heights depending on the functions the buoy is going to be used for, but it is not excessively tall.

Mr. KEITH. Would the buoy to a large extent accomplish the purposes of the weather ship?

Dr. WHITE. Only limited functions of a weather ship, sir, the point being that a weather ship has the capability for taking upper air soundings which is the critical piece of information that you need in forecasting coastal storms, whether they be hurricanes or north-easters.

Mr. KEITH. You mean by met messages?

Dr. WHITE. No, I am talking about upper air soundings. You release a radiosonde by a balloon from the ship.

Mr. KEITH. You call them met messages, I believe, in the trade, meteorological messages.

Dr. WHITE. Yes, the data is transmitted as a meteorological message. The buoy at the present time and in the foreseeable stage of development as we see it would only be able to give you surface weather observations.

I would like to take this opportunity, Mr. Congressman, and I think you are referring to Hurricane Gerda which went up the coast recently and fortunately spared your district in Cape Cod and just glanced it with gale winds, to say that you mentioned that we lost track of Hurricane Gerda.

I don't know where that information comes from. Hurricane Gerda was under excellent reconnaissance at all times. We knew where the storm was at all times. It was not lost at all.

Mr. KEITH. Well, the news which I listened to at 6 o'clock on that day couldn't make any reference to the path of the storm. The news which I listened to at 7 o'clock had great details and according to the people with whom I talked—Don Kent, the Boston weather forecaster, and Oscar Tannenbaum—there was a period of time when the aircraft in the eye of the hurricane found the turbulence so great that they had to leave the storm and for a period of 6 hours it was lost.

Dr. WHITE. Hurricane reconnaissance, Mr. Keith, is carried out to provide six hourly readings of the location of the eye of the storm and its intensity.

In this particular case the Air Force was asked to make additional reconnaissance flights, which they did. Their crews were operating 18 hours a day. They did a magnificent job in the reconnaissance of Hurricane Gerda.

They gave us more information than we would normally request or require from a hurricane, so that I would say that the hurricane position was quite well tracked by reconnaissance.

This does not say that there is not a need for additional weather observations in the ocean south of New England to enable us to predict New England storms better. I think this is also a correct statement.

Mr. KEITH. Well, the New England press indicated in a story dealing with this, that the hurricane was lost for a period of approximately 6 hours, and during this time the radio stations and the press were publishing as fact the forecast that had been made the evening before.

So that down here in Washington we heard about 3 feet of water in the main streets of Hyannis at midafternoon of the following day because that was what was forecast the night before.

Of course, a resort community relies on patronage, and I know that people were discouraged from coming up by reason of the reports that were actually not at all substantiated by the weather pattern that followed.

It is not your fault, certainly, that the newspapers do this. I know of one radio station in Springfield that called the newspaper in Falmouth to find out what the true facts were, and then went ahead and broke the false story anyway.

If we are off on a tangent, I do think that there is a point to be made here. If you had a national agency of this sort—the coordination, the research, the development, the availability of men and equipment, a stronger chain of command—it might be of real value.

Dr. WHITE. I will agree with that statement.

Mr. KEITH. Thank you, Mr. Chairman.

Mr. LENNON. Let me ask you this. You say that "The concept of NOAA . . . may not be the best vehicle for the Nation's effort in the marine environment."

Would you say, Mr. Secretary, that the commission in its 2½ years of study gave every possible consideration to all other alternatives other than the NOAA concept that they recommended?

What would be your judgment before the member of the commission comments on that, if he cares to comment?

Dr. TRIBUS. With all due respect to the commission, I think that the commission's thrust was not as strongly along the line of economic development and the promotion of viable institutions, as it was along the line of promoting activity in the ocean and seeing what it would take to fund that activity, and to taking the view that if we had all this activity that the economic development would probably proceed without really focusing on what it takes to make it occur.

Mr. LENNON. But you have not answered my question. I asked you if you did not have the judgment now that the members of the commission gave some serious consideration to other alternatives other than NOAA as they recommended.

Dr. TRIBUS. Well, if they did, it is certainly not in the report. I wasn't there and I can't answer that question because you are asking me about things that are not of my knowledge.

Mr. LENNON. What would you say about that, Dr. White?

Dr. WHITE. Mr. Chairman, of course, I cannot speak for the commission. I can only speak for myself. Of course, I did not take a stand on the organization proposals. It is certainly clear that the commission did consider other alternatives in their deliberations.

Mr. LENNON. I understood you to say what?

Dr. WHITE. The commission did consider many other alternatives in its deliberations.

Mr. LENNON. All right, sir. Now let me return to you, Mr. Secretary.

I am sure that you are well aware of the action taken by the President on the Marine Commission report and both his program and organizational recommendations are being seriously studied.

When did you prepare this statement that you gave here today, Mr. Secretary?

Dr. TRIBUS. Well, this material has been in preparation now I guess for about a month.

Mr. LENNON. From the time this was being prepared and to the time you gave it here today, you did not know that the Ash Commission to which the President had referred the Marine Commission report had advised us on September 11 that they hoped to begin their study within the next month or 2?

Dr. TRIBUS. I was unaware of that.

Mr. LENNON. When you say that "its program and organizational recommendations are being seriously studied," by whom did you mean it was being seriously studied?

Dr. TRIBUS. Well, I was under the impression that it was being seriously studied by the Ash Committee.

Mr. LENNON. We were, too, Mr. Secretary. That is the reason, having been advised that the President issued the memorandum and having in our files the memorandum of the President to the Ash Commission requesting their study on May 19, we thought it reasonable to assume that they would at least look at this matter casually because you can certainly read this report in 4 months. So that when we called them on September 10 in anticipation of your testimony and testimony of the other gentlemen representing the other agencies. We thought they would tell us something, and we were a little shocked when they advised us that they hoped to begin this study within the next month or 2. We hoped after they got ready to start to begin to commence the study in the next month or 2 that at that time they would be in a better position to say how long it might take to do this serious study that you have said flatly here in your statement they made.

It is certainly not your fault because you believed actually what we did.

If we had not done what we did, we would have accepted your statement in absolutely good faith because you made it in absolutely good faith, so that you see when statements are made before this committee just as statements are made by Members before the House and Senate, they are not always factual because they just don't have the facts. That disturbs us a little.

We would like so much if you would help us get this study moving down there. We don't know what the problem is, but we can't just sit here and wait until next January for the Ash Commission to tell us, "Well, we hope to get the report back to the President and from the President back to the agencies and back to you sometime next spring."

We did that in 1961 and 1962 and it never came about. I believe it is the consensus of the majority of the members of this subcommittee, I am almost sure it is, to move along in this direction. We want to move in concert with not what is in the best interests of the Department of Transportation or the Department of Commerce or the Department of the Interior, or any other agency of the Federal Government, but what is in the national interest. That is what we are concerned with.

We rather believe, and you agree, that generally speaking the Commission's recommendations are in the national interest in this field.

We do appreciate your appearance here, gentlemen. You have been a great help to us as has been indicated by other members of the subcommittee.

Tomorrow morning we shall be privileged to have as our principal witness the Honorable Russell Train, the Under Secretary of the Interior. You gentlemen remember the Secretary when he testified here on other matters.

We will recess until tomorrow morning at 10 o'clock.

(Whereupon, at 12:20 p.m., the subcommittee recessed, to reconvene at 10 a.m., Wednesday, September 24, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

WEDNESDAY, SEPTEMBER 24, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:15 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. We are delighted to have again with us the Under Secretary of the Department of the Interior, the Honorable Russell E. Train.

Mr. Secretary, is it your intention to follow the context of the statement furnished to the committee this morning, sir?

STATEMENT OF HON. RUSSELL E. TRAIN, UNDER SECRETARY, DEPARTMENT OF THE INTERIOR

Mr. TRAIN. That is correct, Mr. Lennon.

Mr. LENNON. Will you proceed?

Mr. TRAIN. Thank you, Mr. Chairman.

Mr. Chairman and members of the Subcommittee on Oceanography, I am glad to have this opportunity to testify on the report of the Commission on Marine Science, Engineering, and Resources, and on H.R. 13247, "To amend the Marine Resources and Engineering Development Act of 1966."

The marine environment is of great interest and importance to the Department of the Interior as well as to Secretary Hickel personally. This Department is responsible for the stewardship and wise management of most of the natural resources of the Nation. These include valuable and generally underexploited marine resources: Fisheries, oil, and gas, other minerals, water, and recreational opportunities—together, of course, with the environmental problems attendant with such exploitation.

The Commission report is an important document which will help guide Congressional and executive branch action for some time to come. It recognizes that the ocean is a source of raw materials for improving our domestic economy and furthering our foreign policy.

It is especially valuable in identifying deficiencies and gaps in the present national program, such as the need to develop new technology for marine resource research and development and to put more effort into broad-scale national laboratories and projects.

Designation of an Assistant Secretary for Fish and Wildlife, Parks, and Marine Resources, and the creation of an Office of Marine Resources to provide him with staff support, was an important response by the Department of the Interior to the recognized need for better internal coordination of its diverse marine resource activities, and for better liaison with the Marine Resources Council.

In addition, Secretary Hickel's personal interest in marine resources has given impetus to oceanic research and development in Interior.

Mr. LENNON. Excuse me, Mr. Secretary. Right at that point for the record when in point of time was the official designation of an Assistant Secretary for Fish and Wildlife, Parks, and Marine Resources made by the Department of the Interior?

Mr. TRAIN. It was prior to this year, Mr. Chairman. I am told October 1968 is the correct answer.

Mr. LENNON. And the name of the individual, for the record?

Mr. TRAIN. At the present time it is Dr. Leslie Glasgow.

Mr. LENNON. Now, the creation of an Office of Marine Resources by the Assistant Secretary, for the record in point of time when was that, Mr. Train?

Mr. TRAIN. I believe that was exactly at the same time, Mr. Chairman, October of 1968.

Mr. LENNON. October of 1968?

Mr. TRAIN. Yes, sir.

Mr. LENNON. That was approximately 3 months before the Commission's report.

Mr. TRAIN. That is correct. The Commission's report came in January.

Mr. LENNON. And there was on the Stratton Commission an Assistant Secretary of the Department of the Interior. He was on the Commission at that time?

Mr. TRAIN. I believe so, sir; Mr. Frank Di Luzio.

Mr. LENNON. The Assistant Secretary for Water Pollution Control of the Department of the Interior. Thank you. You may proceed.

Mr. TRAIN. And I was going to add at this point, Mr. Chairman, that in addition to the two matters to which I referred, there has been a substantial reorganization within the Bureau of Commercial Fisheries which was undertaken early this year, and I also believe that there has been some reorganization within the Geological Survey with respect to the Office of Marine Geology and Hydrology which also bears upon the same general statement.

Mr. LENNON. I think it would be interesting at this point in the record, Mr. Secretary, considering the creation in October of this position of Assistant Secretary for Fish and Wildlife, Parks, and Marine Resources and the creation of an Office of Marine Resources, that a speech was made in April of this year by one of the staff people of this very organization to the effect that at that time the office staff consisted of two individuals and that the budget allocation for this great responsibility created in October last year was a total of \$39,000.

Would you comment on that?

Mr. TRAIN. I believe those figures and that statement are substantially correct.

Mr. LENNON. Thank you. Now you may proceed.

Mr. TRAIN. I would also add, although I do not have the exact figures, that the 1970 budget submitted by the present administration

included funds for some strengthening of the Office of Marine Resources.

I regret to say that the action on the other side last week in the Appropriations Committee deleted those increases.

Mr. LENNON. What was the budget request and the ultimate budget approval for this particular Office of Marine Resources to back up and support the staff of the so-called Assistant Secretary for Fish and Wildlife, Parks and Marine Resources for 1970?

Mr. TRAIN. Subject to permission to submit any correction to the record later, it is my understanding that the existing budget for the Office of Marine Resources is \$32,300 and the Nixon administration 1970 budget requested a \$75,000 increase in that budget.

Mr. LENNON. That is approximately the figure that I have in front of me. Thank you. I thought it appropriate to get this in the record at this point.

Mr. TRAIN. Creation of the Commission was in part an expression of the view that marine affairs in the Federal Government were diffuse and lacked adequate coordination. Development of marine resources and protection of the environment also were matters of general concern.

Recently, the Department published a brochure describing its interests and responsibilities in the ocean. Copies of this report, "Marine Resources Development—A National Opportunity," have been made available to the committee. The report describes the breadth and variety of Interior's marine activities. Interior is the major civilian agency in the Federal Government in oceanic affairs.

A conservative estimate of our budget for marine programs is about \$80 to \$100 million, which is 35 to 40 percent of the total civilian budget for oceanography.

Mr. LENNON. Now, Mr. Secretary, at that point would you provide for the record a breakdown, a definitive explanatory breakdown, of the budgeting of the approximately \$80 million to \$100 million on an annual level which you say is directly related to the civilian budget for oceanography at this point in the record?

Would you furnish that so that it can be inserted in the record at this point?

Mr. TRAIN. I will be happy to do so, Mr. Chairman.

Mr. LENNON. Thank you.

Mr. TRAIN. We may have it right here.

Mr. LENNON. If it is not too lengthy, I think it would be interesting to the members who are present for you to repeat it. If it is going to be too lengthy, we will just submit it.

Mr. TRAIN. No, sir; it is quite brief, and if I may just read the totals and then put the entire document into the record, I think it will give a good picture.

The overall total on this document for the Department of the Interior 1970 budget for marine affairs is \$78.2 million. Now, the breakdown of that total—

Mr. LENNON. That differs a little bit from your statement of \$80 million to \$100 million, but I am sure you can explain the difference between \$78 million and \$100 million. Now you bring it down to \$78 million, which is less than the lowest figure you gave.

Mr. TRAIN. I think actually there is probably a little disagreement

as to exact allocations to marine programs. There are differences of opinion.

Mr. LENNON. All right. Go ahead.

Mr. TRAIN. Within the total of \$78.2 million the following is the breakdown:

The Bureau of Commercial Fisheries, \$45.4 million; Federal Water Pollution Control Administration, \$10.7 million; Bureau of Sport Fisheries and Wildlife, \$9.4 million; Geological Survey, \$4.7 million; National Park Service, \$4 million; Office of Saline Water, \$2.6 million; Bureau of Mines, \$0.9 million; Bureau of Land Management, \$0.5 million; Bureau of Outdoor Recreation, \$4 million; the Office of Marine Resources, \$0.1 million, which as you will note when those two are added, brings the figure up to something over the \$80 million which I earlier mentioned, actually \$82.3 million.

Mr. LENNON. Now, could you recapitulate the figure you gave us for the Office of Marine Resources which was established in October of last year according to your statement? That was \$1 million what?

Mr. TRAIN. The figure that I gave for the Office of Marine Resources for the fiscal year 1970 is \$0.1 million, \$100,000.

Mr. LENNON. Well, I find that difficult to understand when we have just been told that your present expenditure was \$39,300 and the present administration for fiscal 1970 approved that figure for Marine Resources up to, I believe you said, approximately \$132,000.

Mr. PELLY. \$75,000.

Mr. LENNON. Now you say it is over a million.

Mr. TRAIN. No, sir. I think if I may start over again rather than trying to explain what perhaps I said, the present budget for the Office of Marine Resources is \$39,300. The administration 1970 budget submission to the Congress included an increase in that figure of \$75,000 so that the total would be, for 1970, \$75,000 plus \$39,300; and the \$100,000 figure which I read to you as the 1970 budget for that office is the result of rounding. But I think those figures are consistent.

Mr. LENNON. I misunderstood you. I thought you used a figure of \$1.2 million for the Office of Marine Resources.

Mr. TRAIN. If I did, I did not mean to, sir. It was \$0.1 million that I said, \$100,000.

Mr. LENNON. I am sorry. Please excuse me.

Mr. TRAIN. Then for the record at this point I will offer the full table.

Mr. LENNON. Thank you, sir.

(The table follows:)

DEPARTMENT OF THE INTERIOR FISCAL YEAR 1970 BUDGET FOR MARINE AFFAIRS

[In millions of dollars]

Bureau or office	R. & D.	Investment	Operations	Total
Bureau of Commercial Fisheries.....	27.1	3.2	15.1	45.4
Federal Water Pollution Control Administration.....	2.8	4.0	3.9	10.7
Bureau of Sport Fisheries and Wildlife.....	1.8	2.7	4.9	9.4
Geological Survey.....	3.1	.2	1.4	4.7
National Park Service.....			4.0	4.0
Office of Saline Water.....	2.6			2.6
Bureau of Mines.....	.6	.3		.9
Bureau of Land Management.....			.5	.5
Bureau of Outdoor Recreation.....		4.0		
Office of Marine Resources.....			.1	
Total.....	38.0	14.4	29.9	82.3

Mr. LENNON. I would ask you this question.

So many people have argued, including some in the Department of the Interior, that the Bureau of Commercial Fisheries which takes, I believe, approximately \$45 million of this total figure, somewhere in the neighborhood of two-thirds or almost three-fourths, was not directly related to oceanography, but in your judgment it is?

Mr. TRAIN. We consider it a very important element in oceanography.

Mr. LENNON. You charge off, in your general statement, this amount to the oceanography program.

Mr. TRAIN. That is correct, sir.

Mr. LENNON. So that it is your belief and judgment that the Bureau of Commercial Fisheries is inextricably related to the broad spectrum of marine sciences and oceanography?

Mr. TRAIN. Yes.

Mr. LENNON. Thank you, sir.

Mr. TRAIN. We consider the appropriate heading more that of marine resources than oceanography.

Going back again to our budget figures, if seashore land acquisition for public recreation is included in addition to all activities of the Federal Water Pollution Control Administration that relate to the marine environment, the Department's total marine resources budget is at least twice the amount quoted. More than a dozen bureaus and offices in the Department have direct marine resource responsibilities.

These very broad and diverse responsibilities require close coordination. Differences can arise between commercial and sport fisheries. Development of marine oil and gas resources, if not carefully planned and managed, can create conflicts with fisheries and recreation. Water pollution threatens other uses of the marine environment.

Interior's experience in resolving such conflicts, and in coordinating its diverse interests in the environment, has made this Department especially qualified to resolve resource-use conflicts. We are learning to anticipate the problems so that measures can be taken in advance to avoid or alleviate them.

We have had a long and successful record of cooperation with other Federal agencies, the States, universities, industry, and public groups. Our relationships with the Navy and the State Department have been especially close. The Department of Transportation, through the Coast Guard, has been extremely helpful in monitoring foreign fishing operations off our coast and in enforcing fishery regulations.

The Department of Commerce and the Department of the Interior have many joint marine programs which reinforce the capabilities of both agencies. We cooperate with NASA, AEC, NSE, Smithsonian Institution, and other specialized Federal agencies, and our close working relationships with the States are well known. Altogether, Interior has been a leader in marine affairs for many years.

Mr. LENNON. Mr. Secretary, I am going to interrupt you again.

Your \$45 million for Bureau of Commercial Fisheries is impressive. Internationally where do we stand with respect to the production of edible fish for the American population as compared with other nations? Are we somewhere in either sixth or seventh place? Is that not true?

Mr. TRAIN. Are you asking what proportion of the total world production of commercial fish is produced by the United States?

Mr. LENNON. Yes, sir. In other words, the worldwide catch of fish has risen from 20 million tons to 60 million tons in 40 years, but in that same period when they have increased at the international level from 20 million to 60 million tons in 40 years the U.S. production has remained essentially unchanged. Is that a fair statement?

Mr. TRAIN. I believe it is, sir.

Mr. LENNON. And we import today approximately 70 percent of our edible fish?

Mr. TRAIN. That is correct.

Mr. LENNON. That would lead some of us to believe that the Bureau of Commercial Fisheries does not appear to be as dynamic as we would like it to be, which is a matter that concerns all of us and especially the Department of the Interior which has jurisdiction over the Bureau of Commercial Fisheries, I am sure.

Do you want to comment on that?

Mr. TRAIN. We certainly share your concern. In answer to your first question, it is true, as I understand it, that the United States stands sixth.

Mr. LENNON. But you say you have been a leader in marine affairs for many years.

Now, how do you equate your leadership in the vigorous area of expenditures when we have remained unchanged for 20 years in the production of edible fish, whereas the international production has increased from 20 million tons to 60 million tons in that 40 years, and we have stood at sixth place and import 70 percent of our fish? Where is the dynamic leadership that the Department of the Interior is providing in this important field for which you get \$45 million a year, which represents almost two-thirds of the moneys expended by your Department in the so-called marine environment or the marine production?

That does concern us. I know it is not your responsibility, because you are new in the Department.

Well, I have a lot I could say about this, but I do not want to interrupt you more. You go right ahead.

Mr. TRAIN. Turning to the specifics of the report of the Commission, the organizational recommendations in chapter 7 have attracted widespread attention.

The Commission report abounds with references to the National Oceanographic and Atmospheric Agency (NOAA), as if the Commission had in fact decided that creation of a new agency was imperative. Actually, Dr. Stratton has said several times that the Commission recognized that the responsibility for civilian ocean affairs might be delegated to an existing agency, but that this solution would require major reorganization, and that reorganization of any existing agency which had statutory responsibility for nonmarine matters was beyond the terms of reference of the Commission.

Mr. LENNON. Right at that point, Mr. Secretary, for the record, let us get into the record the names of the three Government representatives appointed by the President as members of the Commission. They were the Honorable Charles F. Baird, the Under Secretary of the Navy, the Honorable Robert M. White, Administrator, Environmental Science Services Administration, and the Honorable Frank Di Luzio,

Assistant Secretary for Water Pollution Control of the Department of the Interior.

It is a fact, as we have been reminded in the testimony we have had from the Government agencies at the Cabinet level, that these gentlemen took no part in the recommendations with respect to a so-called Government structure, and appropriately so. It is, however, interesting to note that the Honorable Charles F. Baird, the Under Secretary of the Navy, since he severed his connection with the administration, is now of record as approving and recommending the so-called Government structure referred to as NOAA.

It was interesting yesterday in the colloquy between the Chair and the Assistant Secretary of the Department of Commerce and also Dr. White, the Administrator of ESSA, that the Assistant Secretary made this comment, and I am reminded of the fact that the Assistant Secretary of Commerce took a like position as you are taking in your statement today. I read your statement early this morning.

He made the comment, Mr. Secretary, that he could find nothing in the Commission report that indicated that the Commission had considered the alternatives in the approximately 2½ years that they made their study, the ultimate findings and conclusions and recommendations.

Fortunately, Dr. White was present. So I asked Dr. White yesterday, and have it on the record, that while he did not participate in the actual casting of the vote with respect to the recommendation of the Government structure, he would have to say for the record that the Commission considered all the alternatives, all the alternatives before they came up with this recommendation.

Now, fortunately we had both of them here yesterday. I think it is interesting for you to keep in mind the other departments, and the people representing the Federal agencies which are involved in the field. Certainly it is good that we have it in the record from one of these Government representatives on the Commission that the Commission did consider all the alternatives.

I thought it appropriate to get it in the record again this morning in connection with your statement.

I hope I won't interrupt you any more, but I may. Thank you.

Mr. TRAIN. I think it wise to consider whether a new agency is really necessary. To us it appears to separate resource programs and thereby inhibit comprehensive environmental management. If this Nation is to be successful in solving the complex problems of the environment, its organizational structure and program development must be directed toward managing the environment as a totality—a complex, inextricably related natural system.

Separating the ocean and the atmosphere from the land and fresh waters ignores this fact. Furthermore, I think it is proper to defer action on the organizational recommendations of the commission until the President's Advisory Council on Executive Organization has had an opportunity to view ocean affairs in the full context of Federal organization as a whole, and to consider all alternatives.

Mr. LENNON. To get continuity, if I can, at this point in the record, we are talking about the Ash Commission, Mr. Secretary?

Mr. TRAIN. Yes, sir.

Mr. LENNON. When did the President request the Ash Commission to include in its study the recommendations of the so-called Stratton Commission?

Mr. TRAIN. I do not know the answer to that question, sir. I have been informed by the Bureau of the Budget that such a referral has been made.

Mr. LENNON. Specifically, on May 19. We have a copy of that memorandum for the staff, signed by the President, in this hearing record.

Now, today is September 24 I believe or thereabouts. On September 10th of this year, having in our possession the memorandum for Mr. Ash by the President, of May 19, we called the Commission to ask them if they were in a position to give us their views with respect to this request made upon them by the President on May 19.

I say this because I was surprised to find out that the gentlemen who preceded you, representing, respectively, the Department of Transportation and the Department of Commerce, did know about it.

We asked the Commission if they could give us their views. They advised us by letter dated September 11 that, "We hope to launch this study sometime within the next month or two."

Now, let's see if we can put a timetable on that. May 19 to September 11, and they advise us that they hope to launch the study within the next month or two. That would put us up in November at the earliest, a month or two.

They said, "After we get into this problem, we will be in a better position to estimate how long it may take after that time."

Now, you didn't know that. The Under Secretary of Transportation who spoke for the Secretary of Transportation didn't know that. The Assistant Secretary of Commerce didn't know that, but we knew it, and how long do we have to wait on these things, do you suppose?

I say how long do we have to wait on these things, do you suppose?

Mr. TRAIN. Well Mr. Chairman, I am sure that the so-called Ash Committee will get at this as expeditiously as it can.

Mr. LENNON. Well, are you specifically recommending that not only we defer it, but, speaking for the Department of the Interior, that you are opposed to the enactment of the legislation that is now a vehicle for the consideration of this committee which provides for the implementation of the Commission's report to the degree of establishing a Government structure as recommended by the Commission and the creation of a national council as recommended by the Commission?

Are you saying that officially you all oppose it?

Mr. TRAIN. I would prefer to break that down a bit, sir, because I believe the Department would wholeheartedly support the establishment of the National Advisory Council.

Mr. LENNON. Are you recommending that the bill not be enacted? Are you recommending that?

Mr. TRAIN. We recommend deferment of action on this bill on the proposal to establish NOAA until such time as the Ash Committee has reported. That is our position at this time.

Mr. LENNON. Well, at this point I ask that there be inserted in the record a letter addressed to the Honorable Edward A. Garmatz, September 23, 1969, signed by you, where you recommend that the bill not be enacted.

I ask unanimous consent that this letter be inserted in the record at this point.

I guess you knew we had that.

Mr. TRAIN. Yes, sir.

Mr. LENNON. I don't know whether we were supposed to get it after you testified today or not, but we got it this morning.

(The letter follows:)

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., September 23, 1969.

HON. EDWARD A. GARMATZ,
Chairman, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: Your Committee has requested the views of this Department on H.R. 13247, a bill "To amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment."

We recommend that the bill not be enacted.

H.R. 13247 would provide for the creation of a new Federal agency, the National Oceanic and Atmospheric Agency, to serve as a principal instrumentality in the Federal Government for administration and coordination of civil marine and atmospheric programs. It would also provide for an advisory commission, the National Advisory Commission for Oceans and Atmosphere, to review continuously and make recommendations to the President and Congress on the status of these programs. This proposal follows closely the recommendations contained in chapter 7 of the January 1969 publication, *Our Nation and the Sea*, a report of the Commission on Marine Science, Engineering and Resources.

With respect to the report's organization recommendations, President Nixon on May 19, 1969, requested the Advisory Council on Executive Organization to examine carefully the Commission's proposal in the broad context of Federal organization. Part of President Nixon's request to the Advisory Council on Executive Organization was to compare the Commission's proposals with alternate ways for coordinating and advancing national development of marine sciences. Therefore, we believe that any attempt to create a new independent agency that would include all civilian marine and atmospheric activities is premature at this time. No such legislation would seem appropriate until the Advisory Council on Executive Organization has completed its study and presented its findings to the President.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely yours,

RUSSELL E. TRAIN,
Under Secretary of the Interior.

Mr. PELLY. Mr. Chairman, would you yield?

Mr. LENNON. Yes.

Mr. PELLY. I have been listening to your questioning, and I sympathize with your patience, but I was thinking back to the Hoover Commission on reorganization of the Federal Government and how long that took. I hope you will be a little understanding about this administration and its desire to reorganize on a sound basis considering all the various departments of Government that are concerned. I just hope that you will be a little easy on this witness because he hasn't anything to do with it.

Mr. LENNON. I will say to my distinguished friend that if the members of the former administration would be here taking the position that the members of the new administration are taking, I wouldn't be half as tolerant or as dispassionate as I have been this morning. I think I would really try to chew them out, and I think they would deserve it.

Mr. PELLY. I think you chewed out the former administration for delaying 7 years on the maritime program so that I really think you are very understanding.

Mr. LENNON. I try to be fair. Go ahead, Mr. Train.

Mr. TRAIN. I suppose I would say that this would indicate that there are many blessings in having a new administration. Seriously, Mr. Chairman, it seems to me that this discussion and the letter of the Ash Commission highlights the fact that a major reorganization of the marine responsibilities of the Federal Government really cannot be carried out or implemented without careful attention to the overall total organization of the Federal Government. It cannot be just separated out.

I think this is the major reason why the administration's consideration of this very important matter is taking some time and doubtless will take some little time. I really do not believe that any delay is based upon dilatoriness or a desire to create a delay, but simply is in recognition of the fact which I have just stated, a marine reorganization cannot be undertaken in separation from a total look at the overall organization of the Federal Government.

It is obviously impossible to comment here on the more than 100 recommendations in this report, nor is it necessary. Many of them are for guidance rather than for immediate action. Some will require detailed scrutiny to determine how best they may be implemented. Some of the most important recommendations of the Commission are presented in chapter 2, "National Capability in the Sea."

It recommends establishment of university-national laboratories and coastal zone laboratories, and the strengthening of Federal marine science laboratories.

The Department of the Interior has had considerable experience with such broad enterprises. It has been our policy, whenever possible, to establish our laboratories on university campuses, or closely associated with universities. We also have a long history of close working relationships with the States. In Federal marine affairs Interior has worked in concert with Navy and the National Science Foundation in a three-way effort to consolidate civilian, military and fundamental research and development in marine affairs. It would be well to build on these foundations as much as possible, rather than to establish new centers.

Chapter 2 also includes other proposals important to the Department of the Interior. It recommends development of capabilities to operate on the seabed and subsoil of the Continental Shelf and deep sea by the year 2000.

It recommends that the Federal Government support a dynamic program of fundamental technology to develop the resources of the sea, an objective of particular interest to this Department. With passage of the 1953 Outer Continental Shelf Lands Act, the Department was given direct statutory responsibility for management of the resources of the Outer Continental Shelf.

I have brought along a few copies of a set of charts and reports produced by Interior's Geological Survey recently, depicting the mineral resources of the seabed around the world. Produced by this Department for the August 1969 session of the United Nations Seabeds

Committee, these documents give a comprehensive view of worldwide seabed resources and how much, and how little we know about them.

It has been our stated policy to cooperate with industry to develop techniques when it is impossible for industry to do it alone, but to step aside when industry no longer needs help.

Chapter 3, "Management of the Coastal Zone," is also of especial interest to Interior. In terms of environmental problems, this is where the action is. The coastal environment is a rich breeding and/or nursery ground for most of our marine commercial and sport fisheries. Its natural habitat also provides substantial support for a variety of waterfowl and other wildlife.

It is the location of most of our marine oil and gas and other mining activities. But except for our lakes and inland waters, it is the place where the aquatic environment is most threatened by man's activities. Some 75 percent of this Nation's population lives in the coastal States. It is a recreational area of rapidly growing importance and desirability. It is the place from which most of our growing needs for water must be satisfied. It is the arena of conflicting interests and uses of the environment.

The Commission rightly recognized that management of the coastal zone is a shared responsibility of Federal Government, States, local governments, universities, and industry. It properly realized that a variety of mechanisms would be necessary for successful management, depending on local conditions and needs.

Here again, Interior's existing mechanisms for cooperation with the States, and our considerable experience in these matters will be valuable. The role of the Department of the Interior in the coastal zone was recognized by Congress when it authorized the National Estuarine Pollution Study under section 5g of the Clean Water Restoration Act of 1966, and the National Estuary Inventory Study under Public Law 90-454. When they are completed, these studies should provide an important source of information for considering further actions with respect to the coastal zone.

MR. LENNON. Mr. Secretary, I don't know whether or not you have been advised, but the Subcommittee on Oceanography expects to convene here in Washington on October 28 and October 29 a symposium to which we invited the 30 coastal States and Great Lakes States to participate in a 2-day forum relating directly to the recommendations of the Commission on the so-called coastal zone management.

This leads me to ask you when is the National Estuary Inventory Study to be made available?

MR. TRAIN. That particular study, sir, is due by the 30th of January of next year. That is the statutory date. The other study, the National Estuarine Pollution Study which is under the statutory direction far broader in scope than simply a pollution study and calls for a comprehensive plan for coastal zone management is due, I believe, on the 3d of November of this year. Those are the statutory dates.

MR. LENNON. To what degree has the study progressed where the report is due under the statute, I believe you said January 30 of 1970? Do you know about that?

MR. TRAIN. The study is underway, Mr. Chairman. The funding for the study only became available, as I recall, in this current fiscal year, so that contracts really have only recently been let for the various

studies involved. It is well underway and we are hopeful that the January 30 date can be met. But it would be premature for me to really give a complete status report.

Mr. LENNON. The Deputy Under Secretary, Mr. Gibbons, has agreed to participate as a panel member and hopefully those who come here from the States can receive some really helpful information since you state here, as the other Secretaries did, representing Transportation and Commerce Departments where they said they were involved in this, too, in depth. That is what they both said in their statements.

Based on their wide knowledge that they have of the subject matter according to the statement, they are going to be asked to come and present a position paper on this question. In their statements they say that they are experts in the matter, and hopefully the Department of the Interior, because of its interest and concern and previous involvement and the dialog with the States, that you say you have in your statement, can also make a substantial contribution to the understanding by the representatives of the States and the departments that we all have together.

I am sure your Department will do that. Go ahead, sir.

Mr. TRAIN. I think that you will find that Mr. Gibbons' participation will be very valuable in meeting your objectives.

Chapter 4, "Marine Resources," is also an important chapter to Interior. It demonstrates that, despite the importance of the coastal zone, the United States has important international responsibilities for development of the resources of the high seas. These problems are extremely complex, and they can be resolved only after very careful consideration of all possible alternatives.

There are no simple answers to the questions of limits to national jurisdiction over the seabed and its resources or to the fishery resources of the superjacent waters. The same can be said about the forms of international machinery that might best apply to the deep sea. The solutions proposed by the Commission are not the only solutions, nor necessarily the best solutions. The answers must be found only after very careful deliberation.

Interior has been working closely with the Departments of State, Defense, and other Federal agencies on this matter.

Chapter 5, "The Global Environment," and chapter 6, "Technical and Operating Services," deal with exploration and monitoring of the environment, mapping, safety at sea, and policing, among other matters.

These subjects are just as important to resource development and management as they are to man's direct interests in weather prediction, erosion control, or transportation. The environment of living resources cannot be understood if it is studied apart from the resources themselves. Exploration of sea bottom topography should not be divorced from minerals exploration and technology.

Design and testing of scientific and technical equipment must be coordinated closely with scientific studies of the resources themselves. This requires close liaison between the agencies performing these various functions. Expanded exploration should be planned in connection with improved coordination. Nearly all of the services described are services that Interior must use, or which we can provide. Thus they require close coordination with other Federal agencies. We are pre-

pared to work with other agencies, and indeed have been doing so for years, to insure maximum use of environmental and technical skills.

And finally a word about funding. In chapter 8 of the report the Commission has estimated that the national budget for marine affairs should approximately double in 10 years, making due allowance for changes in the value of the dollar. We believe that environmental problems, including problems of the marine environment, require prompt attention.

We recognize, however, that the executive and legislative branches will have to consider these requirements in relation to other important programs that need to be carried out and which are competing for Federal funds.

That completes my prepared statement, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Secretary. I want to say it is my judgment that the Department of the Interior has perhaps responded more to the creation of the Commission and its recommendations than any other agency or department of the Federal Government. The Department of the Interior has attempted to move.

I think that was, in some degree, due to the fact that they had on the Commission a gentleman who was privy to the information and the studies that the Commission made and who must have carried back to the Department of the Interior the suggestion that "We ought to start moving in this direction," because the Department of the Interior has moved in this direction.

They have shown a great deal more interest in the marine sciences in the Department of the Interior in the last 18 months or last 12 months than there has been in the several years that I have been around this Congress. I think it has stimulated a number of the Government agencies, particularly the Department of the Interior, to get involved.

I won't say what motivated it, because you had that responsibility all the time, as you have indicated, but I think it is an indication of the feeling on the part of the people in the Department of the Interior that "This is a good way to show what we are capable of in the event the Congress should move in that direction."

Mr. Mosher?

Mr. MOSHER. Mr. Secretary, on page 4 of your statement you indicate that it is wise and necessary to consider whether a new agency is really warranted. That certainly is true. In fact, I assume that that is what this committee is attempting to do.

Now, in your letter to Chairman Garmatz dated September 23 you recommend that H.R. 13247 not be enacted. Is that recommendation based on your decision or a decision in your Department that a new agency is not necessary?

In other words, is that recommendation an indication that you are now decisively opposed to any such new agency, or is this recommendation that the bill not be enacted based on merely a matter of timing? Are you saying definitely right now that we should not create a new agency or are you merely saying that we should postpone this decision?

Mr. TRAIN. The final position of the Department for or against NOAA on the merits would, of course, require close coordination with all the other agencies of the Federal Government and the Bureau of

the Budget. I am not in a position to state a position on the merits at this time because there has not been such an overall consideration as yet within the Federal Government.

Mr. MOSHER. Your opposition to the bill, then, at this time, does not indicate that you are unalterably opposed to the creation of any such new agency as NOAA? It merely extends the statement made on page 4 that this needs to be considered further?

Mr. TRAIN. No, sir. I think it fair to say that, looking at this proposal from the standpoint of the Department of the Interior and its responsibilities, and I am trying to be careful to identify what I am about to say as a view simply from one department uncoordinated and without resolution of any interagency differences of opinion, but from the standpoint of the Department of the Interior, we would view with very grave concern an approach to the management of marine resources which was predicated upon a formal organizational separation of the marine environment from what we consider to be the very closely and intimately associated land and coastal zone.

Mr. MOSHER. Nevertheless, in the Department of the Interior, according to your testimony, you do recognize the validity of many of the deficiencies in our present uses of the seas and our policies and organization for the use of the seas. You do recognize the validity of many of the deficiencies to which the Commission pointed?

Mr. TRAIN. Absolutely, sir.

Mr. MOSHER. And, therefore, in order to meet those deficiencies you certainly recognize that if we don't create a new agency to coordinate the job and to meet those deficiencies, then we have to consider alternatives.

The chairman of this subcommittee earlier today indicated our belief that the Stratton Commission did consider many alternatives before they recommended creation of NOAA. Now, that leads us to a question as to what alternative or alternatives the Department of the Interior proposes.

In your testimony you mention designating an Assistant Secretary for Fish and Wildlife, Parks and Marine Resources, underlining the words marine resources, and by the creation of that new Office, the designation of that new Assistant Secretary, are you suggesting that that is a sufficient alternative to the creation of NOAA?

Mr. TRAIN. No, sir. I think very clearly not. I think within the Department we consider that that step was just that, simply a step, a beginning step to evidence, symbolize, if you will, the increased emphasis which the Department believes should attach to marine affairs.

I think that leaving that particular question, the Department of the Interior, and I know the Secretary, feels this way, very strongly is convinced that far stronger emphasis must be placed upon ocean matters. This means a whole variety of things, better programs at the State and Federal levels, better opportunity for the private sector to be involved in oceanic development, better funding, better research.

There does need to be a much greater national commitment.

Mr. MOSHER. And you are suggesting that the Department of the Interior is the logical agency to take this lead and to provide the coordination that is necessary as an alternative to NOAA?

Mr. TRAIN. I don't believe that we are ready as yet to propose categorically an organizational structure to you. I would like to say this

in amplification. The need for better organization for management of the marine environment is part of a larger problem which is better organization within the Federal Government for the management of the total environment and all resources.

I cannot speak for the administration because I do not know its views on this, but I think that within the Department we are not satisfied with our existing organizational arrangements, insofar as our own resources and environmental responsibilities are concerned.

The Department, and indeed all of the resources and environmental responsibilities and organizations within the Federal Government have sort of grown over the years, without any particular logic to shape that organization has taken. I think most of us recognize that. So what I am saying here, I guess, is that I think there is a great deal of sense in only acting upon a reorganization of marine affairs as part of a look at the overall organization within the Federal Government for organization of all of its environmental and resource responsibilities.

Now, assuming that further there are a number of alternatives, we could, I suppose, within Interior, suggest an Assistant Secretary simply for marine affairs. There are all sorts of different organizations. I have even heard it suggested that there should be a new super department of resources and environment with perhaps subsidiary departments, one of which could well be for marine affairs.

These are some of the alternatives that I have heard suggested. Like all alternatives, or most alternatives, there is much to be said for most of them and also there are drawbacks to most of them.

Mr. MOSHER. Mr. Secretary, on page 1 and on page 5 of your statement, you point, I think rightly, to a serious deficiency in our present national program in the lack of any defined responsibility within the Government for the development of civilian technology in marine resources.

The Stratton Commission report repeatedly referred to this deficiency in our present setup. Now, if the Department of the Interior were to take the leadership in the field as an alternative to NOAA, are you suggesting that you could assume this responsibility, the responsibility of administering the research and development of new technology that no other department seems to be doing now, and that desperately needs to be done?

Mr. TRAIN. I see no reason why we couldn't do it just as well as a new agency.

We are involved in marine technology. These have not been large leaps forward, but in small ways. We have been involved as you know, in the Tektite program which we are hoping to carry forward, this time under the full leadership of the Department of the Interior.

So I think that we are learning our way in this field.

Mr. MOSHER. You really are intimating that the Department of the Interior could do the job that needs to be done. One more question, Mr. Chairman.

We have had testimony before this committee recently indicating that it is perhaps always very unwise to try to administer science and development programs at the same time and in the same department or agency that is conducting intricate and extensive day-to-day action operations. Do you feel that that is true, in your own experience in the

Department of the Interior? Certainly you are involved in these matters. Do you think it is unwise to create an agency such as NOAA which would have very important missions in terms of scientific research and development and yet at the same time would be an operating agency in many areas? Do you think this is impossible?

Mr. TRAIN. I don't think it is impossible at all, and in fact I think it probably is the way it should be, whether in NOAA or in the Department of the Interior or some place else.

Now, there are all kinds and shapes of research and I suppose basic fundamental research should be kept considerably far away from day to day operating responsibilities, but I would say generally speaking, that operations and research should go pretty close together.

Mr. MOSHER. Whether or not they work together is a matter of good administration, rather than any basic defect, is that what you are saying?

Mr. TRAIN. I think that is a fair statement.

Mr. MOSHER. And perhaps the interdependence of research and operational activities is so real that good administration had best put them in the same agency, or department?

Mr. TRAIN. Yes, sir. That is my view.

Mr. MOSHER. Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Mosher. Mr. Rogers?

Mr. ROGERS. Thank you, Mr. Chairman. Mr. Secretary, it is good to see you before the committee again. I think you make some good points on the capabilities of the Interior Department as we have also had from the Department of Commerce, the Department of Transportation and so forth.

I think this is natural, and this is what we would expect—that each department would stress their own capabilities and particularly what they have been doing. But the report that took 2 years to make and which we are now covering has as its gist, and what this committee is concerned with really, putting emphasis on the development of our marine resources.

Now, we do have a Department of the Interior for land resources. We have a space agency for outer space, and now we are thinking about going into inner-space and the resources of the water. If we felt it was so necessary to develop the great resources of the land with the Department of the Interior, if we felt that it was significant and added emphasis needed to be placed to create a separate agency for the department of space, it is somewhat in line in my thinking, to put emphasis on the development of the resources of the sea.

When we compare our activity and what we have done under the present arrangement, it causes me even more concern to leave the operation in its present jurisdictional bounds. For instance, look at fishing. What has been the history of our fishing industry of this Nation? Has it gone down or up?

Mr. TRAIN. It certainly has not gone up Mr. Rogers.

Mr. ROGERS. I think we could really say it has gone down—dramatically. For instance, we are now importing into this country \$600 or \$700 million worth of fish products.

Mr. TRAIN. Some 75 percent of our total consumption.

Mr. ROGERS. And it is something like two out of every three fish in the frying pan or a little more, are foreign products.

This causes me concern. I don't think we have put emphasis there. You can go right down the line on all of these developments and that is why the Congress has become concerned about this. That is why we created a Presidential Council, to take it out of just an interagency arrangement, to give emphasis. That is why we formed the Presidential Commission to study this for us and that is why we hope the agencies are going to look at it with a little more imagination and enthusiasm, rather than thinking in a parochial way where we just want to protect our jurisdiction here.

I hope that this committee in these hearings can encourage this in the executive branch. What would you say are our present moneys coming from the resources of the sea, for instance, that your department has jurisdiction of, your royalties that you have, and so forth?

Mr. TRAIN. Referring to my statement?

Mr. ROGERS. I was thinking of the figures.

Mr. TRAIN. I am sorry. This is an estimate I have to give this afternoon on the other side. I beg your pardon. I testify on the seabeds this afternoon and the total that the Federal Government has received from mineral development on the Outer Continental Shelf, and of course most of that has been fairly recently, has totalled \$4.5 million and that is from mineral resources alone.

Mr. ROGERS. And what do we have coming in, would you think, this year, as sort of a total sum, \$600 million? I realize this is an estimate. You may supply the correct figure.

Mr. TRAIN. I understand that the royalty figure will be a minimum of \$300 million for this fiscal year, and that bonus and other payments which cannot be estimated with quite that accuracy could bring the total up to around \$500 million or so.

Mr. ROGERS. And I understand your budget goes from \$80 million?

Mr. TRAIN. In the marine resources field, I have used a figure of from \$80 to \$100 million. That is of a total budget within the Department of, I think, about \$1.9 billion.

Mr. ROGERS. So that you see this causes us concern because you have many activities of \$1.9 billion and yet \$100 million is allocated for the development of the resources of the sea and yet it is bringing in half a billion dollars already. This is just on royalties. We just don't know anything sufficiently about the resources there or the techniques to harvest them.

Mr. TRAIN. Of course, you understand that while the Department has very substantial receipts, in fact I think that outside of the Treasury we are the most important revenue producing agency in the Federal Government, these revenues do not go into the budget of the Department. They go into the general revenues of the Treasury.

Mr. ROGERS. I understand.

Mr. TRAIN. I was hoping maybe you would suggest otherwise.

Mr. ROGERS. Well, as a matter of fact, I wouldn't mind saying, and I think this committee has felt this way, that we are benefitting from the development of the resources of the sea already and some of these funds ought to be plowed back in. I don't think the departments, not just yours, but any of them, have taken this position strongly enough and this holdback of the departments is what has brought this situation to the fore today.

We want some emphasis placed on it and not just an assistant secretary somewhere. We want a proper emphasis placed in an agency that is going to say, "This is our purpose, to develop the resources of the sea and from the income that we can get from the resources of the sea, think what that can do for the economy of the Nation."

I was glad to hear you say that you had not come to a departmental position of opposition to any reorganization, and I think if we keep an open mind this can be helpful. Thank you.

Mr. TRAIN. Thank you.

Mr. LENNON. Thank you, Mr. Rogers. At this point in connection with your questioning, Mr. Rogers, according to the Department of the Interior's own figures in the 8-year period from the beginning of 1960 to 1967, commercial fishery landings did grow from \$350 to \$438 million in that 8-year period. That is approximately one-third, while petroleum production increased by almost 350 percent, from \$423.6 to \$1,404.8 million.

That is petroleum, natural gas, fuel oil. That does not include magnesium and other compounds which also have had a significant growth at that time.

Mr. ROGERS. I know there has been some slight increase in commercial landing, but I think you will find our standing among the fishing nations of the world is that we have dropped to about what now?

Mr. TRAIN. Sixth.

Mr. LENNON. And pushing seventh, I might say.

Mr. ROGERS. So that I wouldn't want to give the impression that we are making progress in fisheries. I think we are not.

Mr. LENNON. We discussed that with the Secretary before you came in and got into the record the international increase compared with our national increase, if any, and it was way, way out of proportion. The Secretary has indicated that we are importing a little better than 75 percent of all edible seafood.

Mr. TRAIN. Mr. Chairman, could I make a comment at this point in the record, because I think it bears upon Mr. Rogers' questions and remarks?

Mr. LENNON. Yes, sir.

Mr. TRAIN. I am not sure that my statement is clear on this. As you look at the Commission's proposal for NOAA, it is very clear that NOAA as proposed does not, in fact, take all of the marine activities of the Federal Government and put them into one agency, because I think we all recognize that this would be impossible. So we are talking about a matter of degree and looking at the activities for example of the Department of the Interior, the same eight to 12 bureaus are very much involved in marine matters and yet the Bureau of Commercial Fisheries would be the primary loss to NOAA. I think this also is one of the things that troubles us about the NOAA approach. It does create the opportunity for greater emphasis, certainly much greater public visibility. But at the same time in achieving that there are also going to be some major losses in an organizational sense.

We will find the marine affairs, for example, of Interior split almost down the middle, as far as budget is concerned, keeping about \$40 million in Interior and \$40 or so going over to NOAA.

This is just a comment I wanted to add for the record.

Mr. ROGERS. Then it would be your idea if we did decide to shift, that you think all of the marine activities should be combined in NOAA?

Mr. TRAIN. No, sir. I don't think that is possible.

Mr. ROGERS. Well, it is possible. I think we could shift it if the Congress decided to put those activities in NOAA. I think this is possible.

Mr. TRAIN. It is possible.

Mr. ROGERS. I don't know how practical it would be as a first step. It may be that we would want to set the agency up with some of the constituent agencies and then as it grows tie them in as it develops.

Mr. TRAIN. There would be a great deal of duplication of effort, I think, as the committee recognizes. For example, in the geological survey, many of the scientific techniques and knowledge and technologies which are applicable to marine geophysical exploration are applicable to the land. I am sure we have the same people involved in much of this.

It is very difficult to try to cut this down the middle as between salt water and land.

Mr. ROGERS. Thank you, Mr. Chairman.

Mr. LENNON. Would the gentleman permit me to ask a question while I think about it. Yesterday the Assistant Secretary of Commerce and Dr. White, the administrator of ESSA both emphatically stated that if NOAA was established as a Government structure that then there is no question, but what ESSA should be a part of the new Government structure.

Now, is it your judgment that if NOAA comes into being that it should not include what you have defined and described as a part of oceanography, the Bureau of Commercial Fisheries?

Mr. TRAIN. I think it would depend on what NOAA was designed to be in the final legislation, because if we look at commercial fish as primarily a resource responsibility, then I believe it should remain in the resource agency. But if commercial fish had some broad responsibility, say, for marine biology, for research into the life systems of the oceans, not necessarily related directly to commercial fish applications, then perhaps that kind of thing ought to move over to the type of agency you mentioned.

Mr. LENNON. I am sure as the former head of the Conservation Foundation you know the capability and background of a number of the members of the Commission, and wouldn't you agree with the Commission which spent a great deal of time and did some real soul-searching to arrive at the conclusion that they did, that the Bureau of Commercial Fisheries ought to be a part of this so-called new Government structure, if one did come into being?

Mr. TRAIN. Well, I certainly give them great credit for much broader competence certainly than I have. They are a very fine group of people and certainly Dr. Stratton is an outstanding individual and any recommendation made by that Commission is entitled to the very careful consideration and attention of this Congress and the executive branch.

Mr. LENNON. Where in the past have you had a council or commission created for a special purpose that has before given the time

and the thought and who had the technology and skills and background to reach the conclusions and recommendations that they have had. Have we had that in the past?

Mr. TRAIN. I don't know of that, sir, but I really do not know how to answer your question. I just don't have the information.

Mr. LENNON. I am reminded that in the first session of the 87th Congress which would be in 1961, that this committee had before it legislation which is in substance in many degrees like we have before us today. The committee wrestled with it and the committee reached no conclusion because the administration then opposed it. So we finally resolved to try to move in the direction of creating a commission with a broad spectrum of membership from private sectors of our economy, the laboratories, the universities, the Federal Government and scientists in general to make this determination for us.

We thought we ought to bring into being the National Council at a high level policy level as a sort of an interim body. The administration opposed that. We finally virtually rammed it down its throat and in 6 months they were the most enthusiastic supporters of the accomplishment of the National Council, and they have done a great job.

Now, here we are 8 years later confronted to a degree with the same problem, how should we move, what should we do? I have just read again the memorandum to Mr. Ash from the President, and I know that the gentleman has seen that memorandum and it was directed to Mr. Ash to consider this very thing that we are talking about now.

Here we get this letter back on September 11, "In about 2 months we will begin to consider it and then at that time we can tell you how long before we will be able to say what we are going to say if we say anything at all."

Now, yesterday the Washington Post had a story that the President was creating a special task force on oceanography. Are you familiar with that?

Mr. TRAIN. I am not familiar with the details. I read something in the paper about it.

Mr. LENNON. How is that related to the so-called Ash Commission? Will we withdraw from the Ash Commission the memorandum of the President for them to make a study and come up with the recommendations, or alternatives to the Commission's report, or should we have to wait another 3 months for this new task force to get ready to start to begin to commence to study.

What is the relationship of the creation of the special task force on oceanography to the Ash Commission's mandate to study this thing?

Mr. TRAIN. I can't answer with any authority, Mr. Chairman. It is my understanding that the Ash Commission has been directed to study organizational matters and I would guess, and it is a guess, that the new task force on oceanography would be looking at substantive program matters.

Mr. LENNON. I imagine you will be perhaps one of the members of that task force. If so, we will get in touch with you. Mr. Pelly?

I don't quite know what the latter part refers to because I have never found that we had any particular excess fishing from domestic

fisheries, but rather it all came from abroad, and I don't know how we are going to curb that. But in this term I have been particularly worried about leaving it where it is because of the inadequacies that you yourself spelled out in your testimony, the failure in the past to come up with a dynamic program which you have indicated you hoped can result either in the Department of the Interior or elsewhere.

I remember one time when we had the then director of the Bureau of Commercial Fisheries, Mr. McKernan and he was testifying on a bill I think for fishery research, and the chairman of this subcommittee said "Doesn't the authorization that is in that bill already exist in the sport and recreation legislation?" Which I think the chairman authored, and he said, "Yes, but we thought we would come in with another bill because this way we probably could get a little more money."

It was really pathetic because the Department has wanted to do a better job and just hasn't had the money from Congress or the ability to sell Congress on a program for the necessary research.

Mr. TRAIN. I think that our budget within the Department in this area has been a substantial limiting factor in our capacity to develop the kind of dynamic fishery program that you want, and we want. We are trying in this area. We are trying in our 1971 budget planning and submissions.

As you know, I am not at liberty to talk about those. All I can say is that we share this concern and within the Department certainly are doing everything we can to strengthen our domestic fisheries.

Mr. PELLY. Well, I would support the delay that you seek if I thought that only by that means we could achieve what I would like to see achieved for the commercial fishing interests of this country. In one respect I could tell you if some of my commercial fishermen had been on the Stratton Commission, what they would have said. "Start with a cabinet level secretary as head of any agency that is responsible for fisheries. That is what they want. They would want somebody that could stand up against the State Department, which has caused probably by their support of certain policies much of the problem of the fishery.

In other words, they opposed any increase in tariffs and supported the free flow of foreign fish to be dumped onto our markets and they have supported foreign aid legislation to build up foreign fisheries and even today, of course, you have a man right now in Peru on fishery research, I believe, trying to help them develop their fishery. These are the problems I get from our State Department.

No one has ever been able to really stand up for the fishing industry. I would like to see it in a new agency if it would be more effective in promoting the restoration of our fishery back from sixth pushing seventh place to first place, where it ought to be. I certainly am not satisfied with the program we have now.

Mr. TRAIN. We are not, either.

Mr. PELLY. Well, let me mention this while I think of it, because you mentioned in your testimony that you had a map of the world's seabeds which was prepared, I believe you said for the United Nations Seabed Committee.

Well, I think some of us here are a little concerned for fear the management of the marine resources, as far as the seabeds are concerned, is going to be turned over to an international organization.

Mr. TRAIN. I will send you a copy of my afternoon statement, Mr. Pelly.

Mr. PELLY. I know there are some Members of Congress who feel that we should give up our sovereignty over part of the Continental Shelf or beyond, where we think we can exploit it for the benefit of humanity. I happen to think we have the technical ability in this country to exploit it for humanity better than any other nation that I know of, or certainly the United Nations.

I simply come back to the point that I hope that whether it is in the Department of the Interior or in the new agency, that it will have a more prominent place, more money, and be able to do a much better job and particularly be able to stand up against those interests that seem to be more interested in developing fisheries abroad than at home.

Mr. TRAIN. In that connection, Mr. Pelly, you may be interested to know that in the latter part of July, I think it was, I participated as a U.S. member of the joint Cabinet meeting in Tokyo on trade and economic matters, I think is the title, and my particular effort there was to open up, or enlarge rather, the Japanese market for American fish products so that while we are importing here 75 percent or so of our fish products for domestic consumption, there is a very real opportunity to enlarge foreign markets abroad for American fishery products.

We are pursuing that aggressively.

Mr. PELLY. We have a resource called dogfish that we would be very happy to have caught and exported abroad and I think the Japanese may be the one area where they can use that resource.

I appreciate your testimony here today. You are not in an easy position because the administration has not as yet taken any position on this particular bill. I do hope it will be forthcoming and that we can have the help of the administration in trying to come up with legislation which we, who have studied it over a long period of years, think is absolutely essential. Thank you, Mr. Chairman.

Mr. TRAIN. We know that much of the expertise lies right here in the committee. We certainly will attempt to work closely with you.

Mr. LENNON. I appreciate that statement, Mr. Secretary. That leads me to say that this committee has been involved in this matter now for a period of a great many years. We have some of the most knowledgeable and dedicated men on both sides of the aisle in this committee in this area.

I would suggest that it would be well for the administration to listen to the counsel and advice of a number of the members of this committee, particularly my distinguished friends, Mr. Charlie Mosher, Mr. Tom Pelly and Mr. Hastings Keith, and all along the line. I wish you could have been here yesterday and heard the questions by the distinguished gentleman from Oregon, a member of the minority side of this committee.

His questions of the Assistant Secretary of Commerce reflected a splendid job, and I hope that the members who were not privileged to hear that will have the opportunity to read it in the record.

I wish he was here today to ask you those questions. I am delighted to yield to a gentleman who has long been interested in this field and knowledgeable in this field, Mr. Keith.

Mr. KEITH. I have been particularly impressed with the comments of my colleagues on the committee. There isn't much left for me to say except to fill in the chinks. As you perhaps know, I am on the Commerce Committee too, and initially sought membership on this committee primarily because I saw more of an opportunity to help my constituents here.

Fish protein concentrate perhaps triggered my interest because that was in a way related to the Commerce Committee. The laws regulating the sale of food that contains filth came out of that committee. I have been terribly disappointed in what has not been done in the past, and so I thought that the report of the Commission was an extraordinarily valuable document. It deserves much more response than it has had, by being referred to yet another agency or another commission which isn't ready to tackle the problem.

I am just going to list some of the things that have been in my bailiwick. I have here some clippings that I brought in this morning from newspapers I read at my home over the weekend. These are from papers in my district, and relate to the problems we are discussing.

"The fishing industry faces extinction." This is an editorial talking about what the Russians are doing in violating our 12-mile fishery zone. "Oil cleanup cost in bay estimated at \$100,000." "Pressure from big brother"—Uncle Sam—trying to get the Continental Shelf resources that Massachusetts and Maine claim are their own.

Here is an article on the grounding at Chappaquoit, where a tug, unlicensed, towed a barge onto a reef 2 miles off course. The barge had 140,000 barrels of oil. "Oil slick hits." "Oil damage to shell fishes seen." Keith, we need more rules. "Oil slick hits Falmouth business. Protection for ships and water fowl. World fisheries rivalry shifts. Oil company wants harbor lands," I could go on and on. Here is another paper with three such articles on the front page.

So let's look at some of the areas where an agency such as is contemplated under the Commission report could be helpful.

First, it would seem to coordinate joint efforts where an interrelationship of existing agencies is required. When I came back from the *Torrey Canyon* disaster, I furnished the Department of the Interior and the Coast Guard with material that I had brought back, about the way the towns handled the oil slick in England. I couldn't even convince the agencies to get together and meet with me to establish a standing operating procedure for dealing with such an eventuality, should it occur on our own shoreline. I personally had to send to each of the towns in my district a standing operating procedure for the use of booms and other methods, which only now are becoming available. I might add that in this latest instance, it would appear that things were well handled but it was mostly because of luck. The barge that went aground came free as they were tightening the lines, so that it wouldn't slip further onto the shore, and they floated it off. Oil floats, as you know, on top of the surface of water, so the barge wouldn't sink. Booms would have been no good in the seas that existed in this particular area, because the oil would slop over the booms; it was a No. 2 grade and very thin.

So, although it came out nicely in the end and the damage was relatively small, had it been crude or residual it could have been a very,

very tragic thing. If it had happened in summertime, it would have cost me a lot of political support.

Mr. TRAIN. If I may interject, I think you were the first one to alert me of that particular accident and spillage and the national contingency plan was involved immediately as I recall.

Mr. KEITH. Yes. You see in that case the lack of an SOP showed clearly. I called you at around 1:10. The tugboat captain came to see me and said that he spoke from the stranded vessel to the harbormaster on shore in Falmouth at around 11:30 p.m. and the harbormaster in turn was reported to have advised the Coast Guard, whose response was that they would come by at 7:30 in the morning, at dawn. I don't know what the true facts are, but this has been related to me.

There ought to be a standing operating procedure. Another incident that raised this question was the oil-leak case in the Catalina Channel. The Coast Guard was not eager to send people out there to learn at firsthand how to handle this, so that there could be available a reservoir of personnel that knew how to handle such cases.

At Chapaquoit, the two officers that were on the beach at 12 o'clock at night when I got there had had very little experience in this matter, although the press indicated that a team with some expertise had gone out from the Federal Water Pollution Control Administration in your department. The Coast Guard, I think, is the lead agency in handling the seaward aspects of such spills.

I would say that the State of Massachusetts and your agency did seem to be functioning very well. I think this incident shows that we do have a great responsibility as to the licensing of tugboat operators, and perhaps inspection as well. I don't believe this particular tugboat had a depth finder. Its radio was not functioning and there was nobody on the barge.

These are the practical matters which we, as Congressmen, have to consider. Besides dealing at the policy level, our constituents really expect us to do something about these problems after we have done all this talking. A recent editorial indicates that Keith had said this could happen ever since he went to the *Torrey Canyon* in 1967, 1968, and 1969—but nothing has been done.

It is not very complimentary to me, to this committee, to the Congress or to the agencies.

Now, here are just a few other things.

Your department has talked about the fisheries problem. Incidentally, the increase in dollar volume of a catch is deceptive. When I first came down here scallops were 27 cents a pound. Now they are \$1 a pound. So that increase in dollar volume doesn't necessarily mean a thing.

International affairs have been mentioned. As Paul Rogers said, the space agency has forged ahead. The cost-benefit ratio in the field of oceanography as contrasted to space, it seems to me, should be our saving grace. We can point to a much greater possibility of reward to our Nation and to the world from the sea than from the planets.

Another point is the Weather Bureau. Our fisheries are dependent upon that, and so are our resort industries as are many others. Yesterday we had a spokesman from Commerce, which has the Weather Bu-

reau in it, and the Coast Guard, which has the ships, has appeared separately. If we were to have NOAA they would be coordinated.

So it seems to me that there are an awful lot of arguments that can be advanced, but I don't think the Nixon administration has really evidenced any sense of urgency. I am particularly concerned that at this late date they would plan to form yet another commission. I would have thought, a la Jack Kennedy, that they would have had those commissions back in October and November and December. They knew they were going to win.

They ought to have been ready for the job. With that I will close my comments.

Mr. TRAIN. Mr. Keith, this isn't particularly relevant I suppose, but I will say this. As some evidence of an effort within the Department to give proper emphasis to this field, I would suppose that since I have been in the Department personally I have spent more time on marine resource matters than on any other single subject, by far.

Now, I mention that for what consolation it might be, perhaps none, but I think it does indicate the interest within the Department and the reality of our commitment.

Mr. KEITH. I know that you have. I have been in touch with your office and I think that the reason you are forced to is that the situation is in such a quandary. This committee has recognized these problems for years. We pleaded with the Johnson administration to do something about it. We passed legislation on this subject which President Kennedy pocket vetoed back in 1961, I believe.

I had a bill which would have provided \$50 million for on-the-job training in the use of these resources of the sea. That was my approach—stop fooling around with more plans and commissions. Subsidize, to some extent, industries' efforts on the offshore shelf and make it a joint effort. What we would learn and gain in the way of revenues would have compensated for the cost.

It was just as simple as that. This was one of the packages that was taken into consideration, but we finally came up with a bill in 1961 which would have established some more specific action. That was pocket vetoed.

So we know in this committee, probably better than any place else in the country, about the problems that you have had to face. But we do feel that they have been built up long enough—that there has been enough research done, with enough good minds devoted to the problem, so that you should be able to look over the list of people who served on this commission and find one of them as your coordinator.

Sam Lawrence has gotten away from you and gone perhaps to a Canadian position, but there are people who could have provided continuity. Maybe you have them. I wish I had one on my staff. These people could have done all the thinking that you are having to redo, because of this new assignment.

I certainly do appreciate that Secretary Train has spent a great deal of time on all of these matters that I have discussed. There are just too many and they are too detailed and difficult.

Mr. TRAIN. Thank you, Mr. Keith.

Mr. LENNON. Thank you, very much. Let's go off the record a minute. (Discussion off the record.)

Mr. LENNON. Back on the record. I recognize the gentleman from Florida.

Mr. FREY. I recognize the time is running out, Mr. Chairman. I would just like to say, Mr. Secretary, that it is good to see you again. I also appreciate the directness of your testimony. I had the opportunity over the last few days as a newly appointed member of the committee to review the testimony and from my other subcommittees it is obvious that no matter how we have tried, it is a mess and is not working.

I note from a lot of the testimony that there are a great many reasons why this Commission won't work, but I find very little except from those in support of the committee as to what we should do in the alternative.

I recognize that you are not going to be able to correct the problems that have been created over the last number of years overnight, and I sympathize with you. Your point of putting this in an overall context has made a great deal of sense to me, but I think, as has been indicated from my distinguished colleagues who have been involved for more years than I have, but for as many years as I hope to be, that we don't want to be sitting here a year or 2 or 3 years from now saying, "Let's do something about it."

The situation is getting so bad, and our fishing is so bad and we want to do something about it. I personally would be willing to wait and see if something is going to be done, but an open end is not what I think any of us want and I think, as you can gather from the comments here, we want to do something. We want to do something for the good of the country and do it as quickly as possible.

I think that message came through loud and clear today. Again, I have some questions, but I will get the answers later. Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Frey.

Mr. Secretary, on page 12 of the brochure you speak about animal protein. This is a subject on which the Stratton Commission and the Fish and Wildlife Subcommittee have this committee particularly has held extensive hearings. I am sure that you are aware that the Congress authorized \$1 million for a fish protein concentrate plant with a daily capacity of fish assigned. The Bureau of Commercial Fisheries have already let a \$300,000 contract for the design of a fish processing plant.

Now, that is true, isn't it? The contract has been let and the Federal Government is obligated to this extent.

Mr. TRAIN. That is right, sir. I would like to say that I considered this one of my few budgetary successes to date.

Mr. LENNON. In getting the \$300,000? Now when was the contract let for the design of the process and the physical plant?

Mr. TRAIN. I would have to supply that for the record, Mr. Chairman.

Mr. LENNON. You don't have any idea off the top of your head and no one with you has any idea?

Mr. TRAIN. Let me consult for a moment. I am informed that the contract for design was let on October 21, 1968.

Mr. LENNON. That was before the actual physical change of administration, wasn't it?

Mr. TRAIN. That is correct, sir.

Mr. LENNON. Of course that money had to be on hand in order to let that contract. I am not suggesting that someone took the contract to do the work with no money appropriated.

Mr. TRAIN. As I understand, some million dollars had been appropriated and some \$900,000 additional was required in order to complete the plant.

Mr. LENNON. Is it my understanding that the land was donated by the Port of Grace Harbor in the State of Washington?

Mr. TRAIN. I believe that is correct, sir.

Mr. LENNON. Now you have the land. Now you have the funding sufficient for the process design and the physical plant and another \$900,000 is needed and is authorized, but yet unfunded?

Mr. TRAIN. I believe we have our appropriations not yet completed sir.

Mr. LENNON. In the fiscal 1970 budget was there an item for \$900,000 to complete this job?

Mr. TRAIN. I am trying to recall the details of this, Mr. Chairman, and I am not sure that my memory is too good, but I think that \$900,000 may not have been in the budget in the form submitted, but there was subsequently a partial add-on of a portion of that amount by the House Appropriations Committee and later by the Senate Appropriations Committee. The total amount added was \$0.7 million.

Mr. LENNON. Mr. Secretary, this might not be relevant to the Department of the Interior. Perhaps it should be in the Department of Agriculture or HEW. Do we have presently now a study that is completed or about to be completed on malnourishment in the United States? Would you know about that?

Mr. TRAIN. I do not know the answer to that.

Mr. LENNON. It is my understanding that both HEW and the Department of Agriculture have been involved in the study of malnutrition in the United States for the last year, but we haven't seen any results.

On May 8, I wrote to the President calling his attention to the possibility of using FPC in the fight against malnutrition, both at home and abroad. I suggested that this product could be used as a part of a program for which Mr. Nixon proposed a billion dollars a year to fight hunger and malnutrition.

Last year the appropriations for AID was \$1.7 billion. This year the administration is asking for \$2.7 billion. So in my letter to the President I raised the question, if we had moved forward sufficiently into the determination that the FPC could be used, why not allocate some of these funds to this purpose. Do you know what the present administration is doing now to get such a proposal off the ground? My response was, "Thank you for your May 8 letter to the President concerning malnutrition. We appreciate having your suggestion to use fish protein concentrate as a food additive and your comments are now receiving careful consideration."

That was on May 15. That is the last thing I have heard from the President.

Mr. KEITH. Will the gentleman yield?

Mr. LENNON. I will be delighted.

Mr. KEITH. This is where we really need a lead agency because

the problem doesn't rest primarily with Interior. The rulings of other agencies of Government require that hake or hake-like fish be used. You can't buy hake today at a price anywhere near the projected price that was given to us when we first talked about fish protein concentrate at 14 cents a pound. They now can't make it at 40 cents a pound, because of the high cost of hake.

The firms involved are hoping that something can be done about their contracts. They just can't get the hake at a price that will enable them to break even. What you have to do is get the Food and Drug Administration or the Federal Trade Commission to change their standards and not require just hake or hake-like fish, because it simply isn't available at an acceptable price.

Mr. LENNON. I would like to ask unanimous consent to include in the record at this point my earlier letter of March 20 of this year addressed to the Vice President on this subject matter and I likewise ask unanimous consent to include in the record at this point the Vice President's response to me of April 10, 1969, and also include in the record my letter of May 8, 1969, to the President and the White House response to me of May 15, 1969.

(The correspondence follows:)

MARCH 20, 1969.

HON. SPIRO T. AGNEW,
The Vice President,
The White House,
Washington, D.C.

DEAR MR. VICE PRESIDENT: The Subcommittee on Fisheries and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries conducted hearings on Fish Protein Concentrate (FPC) last summer at the request of the Bureau of Commercial Fisheries for the need of additional funding to construct a research pilot plant to develop new and less expensive processes for producing FPC.

For years, we have been told how FPC can be used to fight hunger and malnutrition throughout the world. At this time, we are in the process of sending \$900,000 worth of FPC to fight malnutrition in Chile. However, here in the United States, FPC cannot effectively be used to combat malnutrition because Food and Drug Administration regulations require that FPC be marketed in one-pound packages or less.

Testimony developed before our Subcommittee revealed that Dr. James L. Goddard, the then Commissioner of the Food and Drug Administration, had indicated a willingness to waive the one-pound packaging restriction on FPC if the food additive were used in a Government sponsored program to combat malnutrition.

Like you, I am keenly interested in the fight against hunger and malnutrition in this country. We now have a plant in New Bedford, Massachusetts, that can produce FPC that will meet the quality standards of the Food and Drug Administration. This product could be used here to help alleviate the malnutrition we are told exists in our country.

Several federal agencies would be involved in any developed feeding program using FPC as a food additive. It seems to me that you, as Chairman of the National Marine Council on Marine Resources and Engineering Development, could best coordinate and further such a worthwhile program.

I will be glad to assist and cooperate with you in this proposed program.

With kind regards,

Most sincerely,

ALTON LENNON.

THE VICE PRESIDENT,
Washington, April 10, 1969.

The Honorable ALTON LENNON,
House of Representatives,
Washington, D.C.

DEAR MR. LENNON: Your letter of March 20 expressing your interest in the fish protein concentrate program is greatly appreciated. The contribution of food from the sea—and particularly FPC—in combatting malnutrition at home and abroad is high on the agenda of the National Council on Marine Resources and Engineering Development.

The Marine Sciences Council is reviewing the entire FPC program, including the one-pound packaging restriction on the sale of FPC in the United States. I therefore have asked Dr. Edward Wenk, Jr., the Council's Executive Secretary, to keep you informed of developments.

May I take this occasion to say how much I appreciate how your interest and support in marine science affairs has contributed to progress so far, and that I look forward to talking with you personally about future advances.

Sincerely,

SPIRO T. AGNEW.

MAY 8, 1969.

The PRESIDENT,
The White House,
Washington, D.C.

DEAR MR. PRESIDENT: Like you, I am keenly interested in the fight against hunger and malnutrition in this country. As a member of the Merchant Marine and Fisheries Committee, I have been most interested in the development of fish protein concentrate (FPC) as a food additive in the fight against malnutrition.

As you know, FPC is still in its formative state and last year Congress authorized funds for the construction of a pilot plant on the West Coast. The sum of \$300,000 is being expended for the design and construction plans of this facility, and the Bureau of the Budget is holding \$675,000 of the project funds in reserve pending an additional \$900,000 to complete the plant. This last item is not in your Budget.

Our national needs are varied and great, I realize, but I simply wanted to call your attention to the possibilities of using FPC in the fight against malnutrition both here and throughout the world. Perhaps this resource could also become a part of your proposed fight to combat hunger and malnutrition.

With kind regards.

Most sincerely,

ALTON LENNON.

THE WHITE HOUSE,
Washington, May 15, 1969.

HON. ALTON LENNON,
House of Representatives,
Washington, D.C.

DEAR MR. LENNON: Thank you for your May 8 letter to the President concerning hunger and malnutrition. We appreciate having your suggestion to use fish protein concentrate as a food additive and your comments are now receiving careful consideration.

With cordial regard.

Sincerely,

WILLIAM E. TIMMONS,
Deputy Assistant to The President.

Mr. LENNON. I understand, Mr. Secretary, that there was a contract let with Alpine Geophysical Co. for the manufacture of the FPC in April of this year and this contract called for 1,000 tons of FPC. Are you familiar with that?

Mr. TRAIN. Only in a very general way, sir. I know there is such a contract.

Mr. LENNON. Do you happen to know as of this date, how many tons, if any tons, have been delivered for the AID program?

Mr. TRAIN. No, sir, I do not. Of course, the contract is an AID contract. I would be very glad to try to get the information for the record if you wish.

Mr. LENNON. Of course, we have that answer here, and I will furnish it for the record. It is less than 1 ton to date. Now the next question, what is the problem, shouldn't be directed to the Department of the Interior, but should be directed more specifically to AID, I guess.

Mr. TRAIN. I would like to know the answer myself, sir, but I don't have it.

Mr. LENNON. I think, Mr. Keith, the Food and Drug Administration finally approved the formula for this, did they not?

Mr. KEITH. But the formula is just impossible to comply with in quantity.

Mr. LENNON. Why was the contract let for this company then, for 1,000 tons of that particular formula?

Mr. KEITH. The Russians have been catching the hake, to a large extent, and there is a shortage, yet the Government has been unwilling to modify the requirement to less than 75 percent hake. They simply can't get the hake. AID wants 10 tons to go to Biafra, and they are hopeful about delivering it. This is the most immediate need and the most immediate prospect.

I have been down to that plant and it isn't very busy. It is in my district.

Mr. LENNON. The Alpine Geophysical plant?

Mr. KEITH. Alpine's Marine Division. I believe it is called Marine Concentrate Division.

Mr. LENNON. But the contract was for 1,000 tons.

Mr. KEITH. The contract with Alpine, I believe, was for \$900,000 and it was probably about 42 cents a pound.

Mr. LENNON. That would average out about 1,000 tons, wouldn't it?

Mr. KEITH. It is approximately a thousand tons.

Mr. LENNON. The thing that gives me some concern and I know it gives you concern, is that we didn't have the capability of getting the hake and yet we let a contract based on the use of hake.

Mr. KEITH. Exactly my point.

Mr. LENNON. So that you are suggesting that if we had a single agency to coordinate these things, it would be helpful. I have been involved in trying to get the Food and Drug Administration for several years to reach a conclusion as to approving this formula. They finally did, and we thought we were moving.

Now we find we are stalemated even though we have obligated ourselves under this contract to the design of the process, that is the Government prototype plant or pilot plant. We have the land and now we can't get the money to go ahead. I am reminded of the fact that in relationship to malnutrition in Biafra, we did take that up with Alpine and suggested that they try to utilize fish protein concentrate to help the Biafrans.

We took it up directly with the president of Alpine and also at the same time with the vice president.

Mr. Secretary, we are grateful for your appearance here this morning. I won't repeat it but I call your attention to the suggestion I made when we were off the record. We are on the record now. I have found that in our efforts to establish a national council that we had to have some round table discussion outside the committee room with the executive branch of the Government and with the Bureau of the Budget and others to reach agreement finally on the national council which the administration opposed and which 6 months later they told us they were happy that they accepted our mandate that we had to have that sort of setup as a minimum body until the Congress would consider the Commission report, when the report came to us. I think that is something which ought to be explored.

Our next meeting will be tomorrow morning. The witness will be the Honorable Robert Frosch, Assistant Secretary of the Navy for Research and Development and Brig. Gen. F. P. Koisch, U.S. Army Corps of Engineers.

Mr. TRAIN. Thank you, Mr. Chairman.

(Whereupon, at 12:25 p.m. the subcommittee recessed, to reconvene at 10 a.m., Thursday, September 25, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

THURSDAY, SEPTEMBER 25, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY, OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:25 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The committee will come to order.

We are pleased and honored to have as our witnesses this morning Dr. Robert A. Frosch, the Assistant Secretary of the Navy for Research and Development, and also accompanying him we have Maj. Gen. F. P. Koisch, U.S. Army, Office of Chief of Engineers, Department of the Army.

Gentlemen, both of you have furnished the committee statements which I assume that you will follow this morning. Regrettably we only get our copies, I think to be exact, at 10 minutes to 9.

We have not had a chance to review them as we would like to have had. I know it is difficult for you gentlemen to try to get clearance from some other level before you submit your statements.

There should be a rule that witnesses who agree to appear before legislative committees be required to submit their statements at least 48 hours before, so that members of the committee, and particularly Counsel, will have an opportunity to review the statement, and relate it to previous statements, and to the record.

I wish that could be done, and will Counsel remind me to insist upon it in the future.

If we don't, we will just have to cancel out these hearings as scheduled and reschedule them again, and not at the convenience of the witness.

Dr. Frosch, will you come forward?

Are you gentlemen going to present your statements together or will they be separate statements?

STATEMENT OF DR. ROBERT A. FROSCH, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH AND DEVELOPMENT

Dr. FROSCH. With your permission, Mr. Chairman, I would propose to go ahead with my statement.

Mr. LENNON. Yes. Thank you.

(971)

Dr. FROSCH. I am delighted to be invited to come before your committee to speak on the Commission report and the companion legislation H.R. 13247.

Mr. LENNON. Now, Mr. Secretary, since you are before the committee officially, am I correct in my statement to the effect that we did not receive copies of either your statement or Major General Koisch's statement until this morning?

I am now advised that we received General Koisch's statement yesterday afternoon. And am I advised correctly that we received your statement at 10 minutes to 9 this morning?

Dr. FROSCH. I think that is correct, Mr. Chairman.

Mr. LENNON. When did you submit your statement to the Bureau of the Budget?

Dr. FROSCH. I can check that, but it was originally submitted to the Bureau of the Budget on August 8.

Mr. LENNON. On August 8?

Dr. FROSCH. Yes.

Mr. LENNON. When did you get clearance from the Bureau of the Budget?

Dr. FROSCH. We resolved the final wording of the statement yesterday evening.

Mr. LENNON. That is par for the course with respect to the agencies.

I wish you would direct a communication, Mr. Counsel, to the Bureau of the Budget, and I will jointly sign it with the chairman of the committee. I am sure that he will join with me in our insistence that there is on the part of the Bureau of the Budget a little cooperation with the agencies of the Government who work so cooperatively with the legislative committees who have an equal responsibility.

Sometimes I am concerned about this philosophy of the three independent branches of the Federal Government, the executive, legislative, and judicial. There needs to be cooperation between them. It has not worked out that way. We are getting the results of the lack of it this morning.

Now you may proceed, sir.

Dr. FROSCH. Thank you, Mr. Chairman.

On May 19 the President referred the Commission report to the President's Advisory Council on Executive Organization. He asked this Council to review the organization recommendations made by the Commission on Marine Sciences, Engineering, and Resources in the context of broader organizational requirements. He asked that the Commission's proposal be compared with alternative ways of coordinating and advancing national development of marine science. In light of this Presidential action it seems inappropriate to take action on the proposed Commission organizational recommendations until alternatives have been studied.

Mr. LENNON. Mr. Secretary, would you identify for the record the President's Advisory Council on Executive Organization that you referred to, to which you state that on May 19 the President referred the report? What advisory commission on executive organization?

Dr. FROSCH. I believe this is the group that is referred to as the Ash Commission.

Mr. LENNON. Just to keep the record straight, as we have in the past, we have in our files, and it has been introduced in the record,

the memorandum from the President to the Ash Commission in which he specifically and definitively asked them to review the Commission's report, and particularly as it related to the recommendation of the Commission for a central Government structure which is referred to as NOAA.

To continue the continuity of the record so that you will see how we are so often frustrated, as we were with the opportunity of considering your statement before you testified today, this was the 19th of May.

On the 10th of September, this month, we asked the Commission if it had considered the President's request and asked them to confirm our request for this information by letter.

The gist or the guts of the letter is that "We hope to launch a study at the request of the President sometime within the next month or two."

That would put it into October or the 11th of November. Then they go on to say: "After we get into the problem, we will be in a better position to estimate how long it may take."

What are we talking about, Mr. Secretary? Here they received a specific request by the President on the 19th of May. Witness after witness has alluded to it and referred to it, that that is the reason for your failure to take any definitive effort.

This is typical of the Department of Commerce, the Department of Transportation, and the Department of the Interior, the affected agencies. They have all relied upon: "Mr. Chairman and gentlemen of the committee, the President requested on May 19 the Ash Commission * * *."

The Ash Commission says on September 11 that in the next month or two they may get organized so that they can consider it and after they get organized, perhaps then they could project the time it will take.

I just want you to get it in the record.

You may think you are frustrated with the Bureau of the Budget. We are frustrated with the Bureau of the Budget and with the people who have the responsibility to respond to the request of the Chief Executive, it seems to me.

I will tell you what I would do with the Ash Commission if I were President.

Well, we can't exactly say what we would do, but I would say what I would try to do.

Now you may proceed.

Dr. FROSC. Thank you, Mr. Chairman.

Your letter to Mr. Laird of April 25 requested his attendance at hearings as well as his general views on the report. This letter was referred to me and my answer forwarded my personal views on the report at that time. Those views represented generally the Department of Defense view of the report which I will explain shortly.

I must emphasize that the views I am expressing today are those of the Department of Defense and not necessarily the same as the position being developed by the administration as a whole.

Since the Commission report pertains to civil functions to such an extensive degree, a substantial number of comments pertain to some of the civil marine missions of the Department of Defense. As you

know, this responsibility within the Department of Defense resides almost entirely with the U.S. Army Corps of Engineers. I have asked General Koisch to be present with me today. He has a prepared statement and is prepared to answer questions on the civil side of marine sciences.

The appropriate staffs in the Department of Defense have reviewed the Commission report in great detail. While there are a variety of views on many of the detailed items discussed, there is a general view that the Commission report represents a careful and responsible analysis of the civilian-oriented portion of the national program, and that it makes a number of valuable detailed recommendations.

Even where individual commentators have reservations about particular recommendations, it is clear that all agree that the ideas put forward are imaginative and useful in stimulating a great deal of new thought about various possibilities.

As the Commission states in its report, it did not specifically examine the national security aspects of marine matters, nor does it comment on these programs as such, other than endorsing and emphasizing the importance of the Navy's research and development in this area to its operations, and noting the importance of continuing this work.

We concur in this view and it is our intention to continue these programs and to strengthen them in appropriate areas. It should be emphasized that our national security is heavily dependent on the marine environment and that civil programs interface significantly in this environment with military operations and resources.

The general tenor of the Commission report is that military and civil functions in the ocean should be coordinated but separated. We concur in this concept, but wish to note explicitly the importance that "spinoffs" from Navy technological programs have had for the development of the civilian side of national marine science development. It is our hope that coordination and cooperation between the military mission and civil-oriented programs will continue to make this possible. It is certainly desirable.

Since the national security program is not directly discussed, the main issues of DOD concern deal with the interactions of DOD programs (including the major civil responsibilities of the U.S. Army Corps of Engineers) and civilian programs as these may be affected by the organization of the civilian side.

The Navy has played a major role in building the marine science resources of the country by supporting research programs in universities and research institutions. Our requirement for this kind of research support as background and essential support to our mission-oriented programs continues and, in fact, is increasing.

The DOD wishes to continue to support some large marine institutions since we believe that only thus can we maintain a strong contact with these civil institutions and support the kind of research results necessary in the subject areas peculiar to our concerns.

We believe that our support dovetails well with NSF support of these areas. As in the past, the major agencies involved, principally the Office of Naval Research and National Science Foundation, can work together to support a well integrated research program in marine science. As regards possible organizational modes for the civil side,

the proposed establishment of NOAA and NACO must both be considered. The Department of Defense feels that some form of consolidation of marine functions leading to a somewhat smaller group of Federal organizations with major interests in the field would be highly advantageous to the national program, both from the point of view of coordination and of critical size of the elements. We see several problems that need to be taken into account in determining the final form of the organization.

The Commission report discussion of the proposed incorporation of the Coast Guard in NOAA refers to, but does not deal adequately with, the question of its continuation as a specifically identified armed force of the United States, to function as a component of the Department of the Navy in a national security role in time of war.

Maintenance of this identity would somewhat detract from the advantages of consolidation of the Coast Guard with the other fleet operating entities, particularly those of ESSA and the Bureau of Commercial Fisheries, proposed for NOAA.

The Commission report also does not take sufficient account of the large proportion of the Coast Guard's work occupied with search and rescue, and with marine safety matters not closely allied to the other functions assigned to NOAA, and the effect of this rather separate work on its participation in the mainstream purposes of the proposed agency.

MR. LENNON. Just at that point, Mr. Secretary, what was the reaction of the Navy when the Coast Guard was moved from the Treasury Department, which it had been in historically, to the Department of Transportation?

DR. FROSCH. I was not with the Navy at that time so that I am not sure in detail, Mr. Chairman, but I think the principal point was that it was moved as an operating entity into a department in which it was to continue to function as an independently designated entity and as a designated armed service so that its capabilities to do its operations and the required operations in time of war could clearly be maintained.

MR. LENNON. Is there any reason why it couldn't maintain its identity for that purpose if it were put in a Government structure such as NOAA?

DR. FROSCH. Certainly not, but one of the implications and indeed explicit suggestions in the Commission report is that one of the virtues of its incorporation in NOAA would be, and I don't remember whether the term was "merged," but closely associated with, the implication is a form of merger, with the BCF fleets and with the ESSA fleets. Even that could be carried out, I believe, without denigrating the position of the Coast Guard, but it would have to be done administratively, very carefully.

MR. LENNON. How does the Coast Guard relate to transportation?

DR. FROSCH. It relates to transportation, I believe, with regard to its responsibility for safety at sea which is closely allied to some transportation safety.

MR. LENNON. What kind of safety?

DR. FROSCH. Maritime safety.

MR. LENNON. Where do we find Maritime?

DR. FROSCH. That is in the Department of Commerce.

Mr. LENNON. Why?

Dr. FROSCH. I am unable to say. It was there originally and was never moved.

Mr. LENNON. Here now you move the Coast Guard into the Department of Transportation on the philosophy that it is inexorably tied to the Maritime interests related to transportation, but we keep Maritime over here in still another department. Why?

Dr. FROSCH. I am unable to say, Mr. Chairman.

Mr. LENNON. Thank you, sir. Neither am I. Go ahead.

Dr. FROSCH. It also seems clear that the large number of functions assigned to NOAA would require more resources than will be brought to it by the organizations that will come together to form it initially.

The matter of additional staff strengthening is not addressed adequately in the Commission report. It is probable that a natural recruiting ground for initial staff augmentation might be from the Navy program, particularly in the area of ocean engineering and technology. Some such assistance to founding the civilian program in this field might well be wise, but unless carefully thought out and accomplished the result might really be to cripple a Navy program that the Commission wants preserved, rather than to increase the national program and capability.

This point should be examined carefully in light of our earlier comments on the usefulness of Navy technological programs and the need for Navy research programs in this field, and the necessary detailed planning to avoid unnecessary difficulties accomplished before proceeding with the proposed NOAA.

I would like to digress a moment and just say that what we are highlighting here are things that concern us, that might form difficulties within the Government or for the national security interests in the course of establishing NOAA if it were to be established.

I don't in any sense want to imply that these are insuperable difficulties but only that they need to be carefully handled or we will find some problems that we didn't look for on our hands.

Mr. LENNON. That leads me, Mr. Secretary, you having raised the probability that "a natural recruiting ground for initial staff augmentation might be from the Navy programs," to say that right at this point the Navy has announced its plans to mothball some of its oceanography and other types of vessels of that kind such as the *Lee* and the *Keller*, haven't they?

Dr. FROSCH. We have some problems with oceanographic ships certainly.

Mr. LENNON. Let's talk about the new ships that you are planning now to mothball.

What type of vessel is the *Gillis*?

Dr. FROSCH. The *Gillis* is an ocean research ship.

Mr. LENNON. What about the *Davis*?

Dr. FROSCH. That is an oceanographic ship.

Mr. LENNON. That is a new ship?

Dr. FROSCH. That is a relatively new ship.

Mr. LENNON. What are your plans now for that vessel?

Dr. FROSCH. I would have to supply that for the record, Mr. Chairman.

(The information follows:)

USNS "DAVIS"

The USNS *Davis* (T-AGOR-5) is a civilian manned oceanographic ship operated by the Commander, Military Sea Transportation Service for the Oceanographer of the Navy. Since being placed in service as new construction in 1963, as a Pacific "pool" ship, it has supported oceanographic projects at West Coast Navy Laboratories and the Naval Oceanographic office, and the education of Navy officers in oceanography at the Naval Post Graduate School, Monterey, California. The USNS *Gilliss* (T-AGOR-4) is of the same class, and has an identical mission except that since entering service in 1962 it has been assigned to a pool of support ships in the Atlantic. Two new AGOR class ships, the USNS *Desteiguer* (T-AGOR-12) and the USNS *Bartlett* (T-AGOR-13), now completing their shakedown, are being assigned in similar fashion, and would bring the total number of pool ships to six. While Navy requirements are sufficient to utilize all six ships full time, funding constraints demand a compromise in the services provided and a continuation of the 4-ship pool level of prior years.

It has been found necessary to reprogram operating and overhaul costs approximating two million dollars annually by ordering immediate inactivation of *Davis* and *Gilliss*, the two oldest pool ships. Their reactivation will be considered during the apportionment of FY 71 funds next spring, in relation not only to other Navy-wide urgent requirements but also to the needs of the total Navy oceanographic program. Until then, and possibly through FY 71, the ships will remain in caretaker status. It is currently intended that funds for operating both the *Davis* and the *Gilliss* will be requested in the FY 72 budget.

Mr. LENNON. As a matter of fact, you raise the question that the Navy might be drained off if this new organization were established, and yet you find yourself in a position that you are mothballing your oceanographic and hydrographic vessels, not your old ones, but the two new ones, is that right?

Dr. FROSCH. Yes, we have such problems.

Mr. LENNON. Why?

Dr. FROSCH. We have fiscal problems in supporting all of our vessels and there gets to be a competition between supporting operational fleet vessels, removing them or supporting research vessels or removing them, and we are trying to make the best compromise for the Navy's programs.

Mr. LENNON. Have you ever thought about transferring these vessels now that you have to mothball, these vessels that the taxpayers of America paid for at your request?

Dr. FROSCH. We have authorized the use of these ships or the transfer at least for a period of time to other agencies in the Government, but they have not been able to support them either.

Mr. KEITH. Mr. Chairman.

Mr. LENNON. Yes.

Mr. KEITH. Aren't there some institutions in the private sector or semiprivate sector that could use these ships?

In fact, don't you have some ships of this sort assigned to such institutions as Woods Hole?

Dr. FROSCH. Yes; we do, Mr. Keith, but there too, the support of the programs which pay for the operation of such ships is principally from Federal moneys so that the transfer of a ship or the bailment of a ship alone is of no use to the institution unless there are program funds available for its support and, in the same sense that we do not have the funds in the budget to continue to operate the ships for Navy purposes directly, we do not and apparently the other agencies do not

have the funds available to support additional ships at the research institutions.

Mr. MOSHER. Mr. Chairman, could I make a comment?

Mr. LENNON. Mr. Mosher.

Mr. MOSHER. I think it is the feeling of the members of the House who generally support NOAA, or the NOAA concept, that this concentration and coordination of effort in the new agency would attract support for these oceanic functions such as Congress has never offered before.

It would attract new impetus, new enthusiasm, and would provide the opportunity for the supplying of resources such as efforts in the oceans have not had before.

I think you are absolutely right on page 6 where you say that clearly:

The large number of functions assigned to NOAA would require more resources than will be brought to it by the organizations that will come together.

We all recognize that, but I think we who support it feel very strongly and confidently that Congress would soon give this priority attention and supply these added resources.

Mr. LENNON. Thank you, sir.

What happens to the crews of these vessels, these new vessels and old vessels in the hydrographic and oceanography field that you are mothballing now?

Dr. FROSCH. The crews of the vessels that are operated under MSTs are employees of MSTs, and I would presume that they are employed on other ships if MSTs has the budget and resources to employ them.

Otherwise, they would be likely to be caught up in a reduction of force as is happening elsewhere in the Navy civilian organization.

Mr. LENNON. Let me ask you to comment on this:

Now that Congress has authorized and funded the construction of these vessels to conduct what you have persuaded the Congress to authorize and construct them for, that is to conduct important marine surveys. Is it sound management practice to tie up these vessels when the administration is insisting upon the IDOE and the importance of charting our continental shelves?

They say in one breath, "We must chart our Continental Shelves. We must move forward in the IDOE." This is the administration position.

But at the same time you are tying up and mothballing these important vessels which would be related to this type of survey, aren't you?

Dr. FROSCH. Mr. Chairman, this is an important mission and something we want to carry out, but the basic strength of the Navy is also an important mission which this administration and previous administrations have emphasized. Faced with fiscal stringency, we have to balance the places in which we take cuts in budget, and frequently the choice almost comes down to the distinction between the number of fighting ships in the Navy and the number of research ships in the Navy.

We don't cut either one completely at the expense of the other. We try to balance and cut both when we must.

Mr. LENNON. Let me ask you this question: What was the figure for fiscal 1970 for ship construction for the Navy, this year?

Dr. FROSCH. It was about \$2.4 or \$2.5 billion.

Mr. LENNON. Yesterday afternoon about 5 o'clock the House Armed Services Committee added a billion dollars. Are you going to the Budget and going to the Appropriations Committee, assuming that this procurement bill is passed by the Congress, and make your fight for a viable Navy, or are you going to capitulate to the Bureau of the Budget, knowing, as you have indicated, the essentiality of moving forward with the construction of new vessels to replace many which are obsolete? What are you going to do?

Dr. FROSCH. The Navy will certainly be in favor of fighting for a strong Navy, but I am unable to say what the resolution between the Department of Defense and the Bureau of the Budget will be.

Mr. LENNON. I know what it will be. You will fall back to \$2.4 billion when you go before the Appropriations Committee, instead of staying with the authorization bill which would provide \$3.2 billion for the Navy.

Go ahead. All right.

Dr. FROSCH. The relationships between the Department of Defense program and that of NOAA would need to be carefully coordinated both to prevent unnecessary duplication and to insure that the existence of either program could not be used as an excuse to cut the other unwisely.

The form in which National Advisory Committee on Oceanography is proposed seems to us to be unwise on several counts. The mechanism suggested would appear to put one operating agency (NOAA) and what amounts to its advisory group (NACO) in an effectively controlling position over other operating agencies with their own special mission requirements. This nearly guarantees petty conflict arising from the neutral tendency of NACO to regard NOAA jobs as more important than those of other agencies.

The Department of Defense believes that an interagency group of representatives from the concerned organizations at, for example, the Assistant Secretary level, assisted by a group of outside advisers working with them, would be preferable to the NACO proposal.

These groups might work throughout the year, but report to a more senior policy group like the present council, meeting annually to review the subject and report to the President. An alternative to a special senior policy group for annual review would be an annual review by the Federal Council on Science and Technology.

None of these organizational schemes is perfect, and all seem somewhat cumbersome, but the organization of a field that is principally defined by an environmental subject and area, although it does include some specific missions in it, in a government that otherwise tends to be principally functional and mission-oriented cannot be easy.

It might also be noted that establishment of another independent agency reporting to the President may not be entirely wise.

On the other hand, the Department of Defense believes that if an independent agency were created there might be legitimate objections to the subordination of it to any of the existing departments.

Mr. LENNON. Mr. Secretary, you are suggesting that the members of NACO couldn't rise above petty jealousies in the Department. That is what you are saying, isn't it?

Dr. FROSCH. I don't say that I am suggesting that they could not. I am saying that on the basis of a good deal of history they are unlikely to, and I don't think that this is a prejudgment of the character or the stature of the people.

It is simply the case that in all of the advisory committees that I have dealt with that have a responsibility to a particular department or agency there is a natural tendency for them to be most familiar with the virtues of that department or agency and to tend to support it particularly against other departments with which they are not completely familiar.

Mr. LENNON. Now let me ask you a question about your comments in the last paragraph on page 8.

Do you question the background and the capability and the dedication of the members of the so-called Stratton Commission in their judgment with respect to a centrality of the Government structure such as they recommend?

Dr. FROSCH. No, but I think that by reading the Commission report, and with my knowledge of many of the Commission members, and from some of the discussions with them that I was asked to participate in, it is clear that they were not completely satisfied that they had a perfect organization.

They were trying to use their judgment on what might be a good organizational scheme.

An additional comment, I think, may be contained in the fact that the Federal Government members of the Commission rather tended to abstain from comment on the organizational recommendations.

Mr. LENNON. You had three governmental agencies with representatives as members of the Commission.

Dr. FROSCH. Yes. Well, there were four Federal Government employees who were members.

Mr. LENNON. The fourth was the MSC.

Dr. FROSCH. Yes.

Mr. LENNON. The Navy was represented by whom?

Dr. FROSCH. First by Mr. Baldwin, then by Mr. Baird, both when they were Under Secretary of the Navy.

Mr. LENNON. Both when they were Under Secretary of the Navy. We do know that the representative of the Navy on the Commission and Dr. White from the Department of Commerce, the administrative head of ESSA, and the representative of the Department of the Interior refrained from taking part in any vote on the question of establishment of NOAA.

Since the distinguished Under Secretary of the Navy, a member of the Commission, left the Navy, what has been his position as a private citizen and at the same time a knowledgeable member of this Stratton Commission?

Dr. FROSCH. He has been generally in favor of the recommendations of the Commission. That is Mr. Baird, I presume, you are talking about.

Mr. LENNON. Yes. It is interesting to quote his statement made before this committee:

Since January 20 I have been a private citizen.

That is true of quite a few people.

I have made several speeches on the Commission report and I have made it a particular point, and I would like to make it a matter of record here, that as a private citizen and as one who participated in the work of the Commission I support wholeheartedly the organization recommendation of the Commission.

Now, are you saying that there is anyone in DOD or anyone in the Navy who is in a better position to make a judgment than your representative on this Commission?

Dr. FROSCH. Well, our representative——

Mr. LENNON. Was any man in DOD or in the Navy subject to the opportunity to participate in the panel discussions and to consider all the alternatives that might have arisen in the panel discussions and in the full Commission in its determination as to what it should recommend to the Congress and to the President?

Who in the DOD and the Navy is in a better position to speak to this subject than the person the President appointed from the Navy to represent the Navy on this Commission?

Dr. FROSCH. Well, I don't think any of us is as privy to the discussions in the Commission as Mr. Baird has been. I hate to quote someone who isn't present, or to attribute something to him, but I don't think he would disagree with the statement that the organizational recommendations of the Commission were merely the best that they could arrive at.

In don't think he would say that they are perfect, and certainly in my conversations with him he never suggested such a thing. I have not, I believe, in this statement said they were impossible. I said they looked cumbersome, but I also said I think that it is very difficult to arrive at something which does not look cumbersome, because this is something which by its character is somewhat different than other organizations in the Government.

Mr. LENNON. We will await your statement as to a definitive alternative.

Go ahead.

Dr. FROSCH. I don't believe I recommend any specific alternative. I have tried to point up some difficulties.

Mr. LENNON. Don't we have a right to expect you to present some alternatives?

Go ahead.

Mr. KEITH. He wouldn't be inclined to say that the existing structure in the Navy, or any other department of Government, was any less cumbersome than the one we are proposing here, would he?

Mr. LENNON. He might be suggesting that it might not have been well to organize DOD, but just let the Navy remain as a separate department.

Go ahead, Mr. Secretary.

Dr. FROSCH. With respect to H.R. 13247, the proposed transfer of the National Oceanographic Data Center to the National Oceanic Agency by the bill is noted.

The National Oceanographic Data Center is currently under the administrative management of the Naval Oceanographic Office and is supported by funds from 10 departments and agencies. Its technical programs and policies are established and reviewed by an interagency advisory board consisting of the representatives of these sponsoring agencies.

The data center serves as a central repository for the Nation's unclassified oceanographic data. In addition to its chartered mission, the data center is also designated as an oceanographic information and analysis center for the Department of Defense to provide services to users within the Department of Defense.

The importance of the data center as an adjunct to the military mission is evidenced by the major role Navy has played to support the center, and by the fact that Navy and Navy contractors are the major users. The Department of Defense would not object to the transfer of the data center if the new organizational arrangement was supportive of its national charter.

We believe the data center would be expected to continue to provide data services to all users, Government, and private, civilian and military, in keeping with its basic mandate as a national data repository.

With regard to the National Advisory Committee for Oceans and Atmosphere proposed by the bill, there are two features concerning which the Department of Defense has serious reservations.

The first is that the mechanism suggested for the advisory committee would appear to put the proposed operating agency, the National Oceanic and Atmospheric Agency and its advisory group, the Advisory Committee for Oceans and Atmosphere, in an effectively controlling position over other operating agencies with their own special mission requirements.

This appears likely to generate conflicts that would tend to give the advisory committee an unwarranted amount of bias toward the National Oceanic and Atmospheric Agency as opposed to the equally vital interests of other Federal agencies.

Second, the bill provides for participation by Federal agency representatives on the advisory committee only by relegating them to observer status. The Department of Defense believes that such an arrangement could severely jeopardize the advisory committee's effectiveness as the principal governmental advisory group for the Nation's marine and atmospheric activities.

It is noted that the National Oceanic and Atmospheric Agency would function in the conduct of mapping and charting, encompassing the world oceans. The Department of the Navy has statutory responsibility for the provision of accurate charts, sailing directions and manuals for the use of all vessels of the United States and for the benefit and use of all navigators generally, although its primary concern is with defense requirements and in the deep oceans around the world.

The U.S. Army Engineer District, Lake Survey, has a generally similar role on the Great Lakes. The Environmental Science Services Administration, a proposed component of the new National Oceanic and Atmospheric Agency, would be concerned primarily with civil mapping and charting activities which are confined largely to the U.S. territorial waters and the continental shelf areas. Care should be exercised to insure that mapping and charting responsibilities are clear in order to avoid unnecessary duplication of effort.

Also, care should be exercised to insure that the lines of responsibility or function between the proposed National Oceanic and Atmos-

pheric Agency and the Department of Defense would be clearly delineated.

H.R. 13247 proposes further that the testing and calibration of instruments are functions assigned to the National Oceanic and Atmospheric Agency. This would appear to duplicate work being done by the recently established National Oceanographic Instrumentation Center. The Center is under the administrative control of the Commander, Naval Oceanographic Office and guided by an advisory board representing 15 interested agencies.

The Center's mission is to serve as the national focal point for knowledge of technology related to testing, evaluation, and calibration of sensing systems for ocean use, to enhance the quality of such systems by the dissemination of operational results and technical information, in order to serve the national oceanographic community. However, broader national benefits might result from incorporation of this center into the proposed National Oceanic and Atmospheric Agency.

Mr. LENNON. Right at that point, Mr. Secretary, when was the National Oceanographic Instrumentation Center established?

Dr. FROSCH. It was established formally as a national group sometime last spring, if I recall correctly, but it had been in existence as a Navy instrumentation center which was fully providing services to the oceanographic community at large for some number of years.

Mr. LENNON. Who established this, the National Council?

Dr. FROSCH. Originally it was established by the Navy. The National Council recommended that it be converted into a national center and suggested that the agencies that had an interest could get together to establish it, and that is what was done. The agencies themselves agreed upon a mechanism for designating it a national center and agreeing on the funding arrangements.

Mr. LENNON. Did the Navy go along with that recommendation of the National Council?

Dr. FROSCH. Yes, indeed, it did.

Mr. LENNON. Or did it prefer to continue it as it was before?

Dr. FROSCH. No, we went along with it, and in fact I was in favor of it at the time and saw some considerable advantages in doing it that way.

Mr. LENNON. You are saying that the Navy at every level was enthusiastic about it? Is that what you are saying?

Dr. FROSCH. It is impossible to say of any proposal that the Navy at every level is enthusiastic about it, but at the senior level, sir.

Mr. LENNON. I have information to the contrary.

Dr. FROSCH. There were certainly people opposed. One can pick any given proposal and say that of it.

Mr. LENNON. All right. Go ahead.

Dr. FROSCH. The bill would transfer the U.S. Coast Guard from the Department of Transportation to the proposed agency with the proviso that the Coast Guard shall operate as a part of the Navy in time of war or when the President shall so direct.

However, it is the concern of the Department of Defense that the Coast Guard may not be maintained in an adequate state of readiness as a member of the Armed Forces of the United States if its forces are "combined" with the other elements of the proposed agency as rec-

ommended by the Commission on Marine Science, Engineering and Resources.

Mr. SCHADEBERG. Mr. Chairman, would the gentleman yield there?

Mr. LENNON. Yes.

Mr. SCHADEBERG. Can you say why you feel that it couldn't be?

Dr. FROSCH. I am not saying that it couldn't be. What we are saying is that there really is a problem, and the problem is that we are taking a designated armed force which has military command lines which are adaptable to its become a fighting force in time of war and there is a not very precisely defined suggestion in the commission report that it be combined with the Coast and Geodetic Survey, which is a uniformed force but not a military force and with the Bureau of Commercial Fisheries fleet, which is a civilian force.

One would have to be rather careful to see that the arrangements of line of command and the arrangements for training, for military training, and so on, the Coast Guard were maintained in this combination.

For example, if the way of combination were to make all three of the groups uniformed but not military or civilian, then there might be a problem.

It is a question of how the combining operation is to be carried out and what the final combination looks like. It could certainly be done, but that would have to be done carefully.

Mr. SCHADEBERG. That is the point I want to make. It doesn't say that it can't, but that problems probably exist now and will exist no matter what is done.

Certainly the Navy would be interested in having them serve in time of war. It would have an eye on the Coast Guard in the new agency and be alert to the fact that it wasn't being taken care of. I am sure that the various interested committees in Congress certainly wouldn't want that to happen either.

Dr. FROSCH. I merely point it up as a problem that would have to be watched.

Mr. LENNON. Counsel for the committee is a former Coast Guard officer and a distinguished professor of law. He has asked me to ask you a simple question: Can the Coast Guard be any busier in the future than it is now?

Dr. FROSCH. It would be hard for that to happen I think. They are certainly very busy now.

Mr. LENNON. It has about as many roles and missions for a relatively, comparatively small agency, and is busy all the time.

Dr. FROSCH. There is no question about that.

Mr. LENNON. Go ahead, sir.

Dr. FROSCH. The requirement to so maintain the Coast Guard as provided by 14 U.S.C. 2 for transfer to the Department of Defense as provided by 14 U.S.C. 3 is mandatory.

Returning to the commission report, it proposes a National Laboratory System and National Projects with the objective of forming a comprehensive set of organizations and programs which could serve to stimulate the whole field.

Establishment of the university/national laboratories, however, should not be used to prevent or to make impossible forever the entry of major new organizations into the field, since the formation of new groups is frequently a powerful stimulus to progress.

The consideration implies the necessity for the importance of the availability of support to research and development entities other than the national laboratories.

The national projects proposed by the Commission are interesting and might stimulate further progress. It must be recognized, however, that some of them are already underway in several forms and to various degrees and thus the selection of what to do next must take detailed account of the current status. This matter is incompletely treated in the Commission report.

In addition, before proceeding, a careful reexamination of the costs to be expected for the various projects should be undertaken since the Commission's costing was admittedly crude, as it had to be considering the dimensions of their task and the time and staff available. We should note that these recommendations as well as other Commission proposals are also being reviewed by the administration.

As for the international legal-political framework for seabed resources, the DOD position, briefly, is the following: First, a narrow Continental Shelf regime coupled with a clear affirmation of the continued freedom of the superjacent waters and airspace beyond the limit of the territorial sea would be the most compatible with our national security interests.

The national security interests of the United States would be best served if the territorial seas and straits questions were settled before any international agreement is reached on defining the outer limit of the Continental Shelf.

As indicated previously the DOD attaches great importance to the settlement of the territorial sea question prior to submitting any initiative on the seabed problem. The main reason is because the limited jurisdiction of the coastal States, insofar as seabeds are concerned, might be extended unilaterally to include other rights if there is no firm prior international agreement on the extent of total sovereignty.

In consonance with this quoted position, the DOD generally supports the rationale contained in pages 141-157 of the Commission report and considers the detailed recommendations worthy of further study.

However, no national decision should be made on such matters without full consideration of the vital national security interests which could be significantly affected by them. The important caveat represented by the Commission's qualifications on page 147 must be emphasized, and I would like to quote it here:

We also would like to stress that our major recommendations are interrelated. Rejection of any one of these recommendations would raise serious questions in the mind of the Commission as to the advisability of continuing with the others.

Mr. Chairman, that completes my statement. I am now ready to try to answer any further questions the committee may have.

Mr. LeENNON. Let us go off the record for a minute.

(Discussion off the record.)

Mr. LENNON. Back on the record.

Thank you, Mr. Secretary.

Go ahead, sir, General Koisch.

STATEMENT OF MAJ. GEN. F. P. KOISCH, U.S. ARMY, DIRECTOR OF CIVIL WORKS, OFFICE, CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY

General KOISCH. Mr. Chairman, the statement I am about to give has been cleared by the Bureau of the Budget.

Mr. LENNON. Thank you.

Mr. KEITH. I take it it is entirely negative.

General KOISCH. I am Maj. Gen. F. P. Koisch, Director of Civil Works of the Office, Chief of Engineers. I am very pleased to appear before you today in connection with our Nation and the sea, the report of the distinguished Commission on Marine Science, Engineering and Resources, and your bill H.R. 13247, which would implement some of the Commission's important recommendations.

Mr. LENNON. General, at that point I want to correct the record.

When you addressed me as Mr. Chairman, you referred to my bill. This bill is a bill submitted by the full membership of the subcommittee on Oceanography.

Now go ahead.

General KOISCH. The Commission's report is a tremendous contribution. Its views on our Nation's stake in the oceans merit the careful attention of everyone at the Federal, State, local and private level who is concerned with formulating oceanic policies and programs for the future.

The Commission's chapter on the coastal zone and the Great Lakes is of particular interest to the Army. The Army Corps of Engineers involvement in these areas began in the infancy of the Nation and has grown as the Nation has grown.

In the beginning, national survival was so clearly dependent on the security of the Atlantic and Great Lakes coastlines that the Army Engineers early centered on coastal fortifications and problems besetting construction at the land-sea interface. This attention soon quickened because some of the earliest acts of Congress involved navigation improvements. Over the years, the Corps' interest in protecting and improving the use of the coastal zone has broadened as the Congress has added responsibilities.

Today the Corps is engaged in a \$200 million annual program of researching, planning, designing, constructing and/or maintaining coastal harbors, intracoastal waterways, interoceanic canals, hurricane barriers, and shore and beach stabilization programs. The Corps also issues permits for all construction in navigable coastal waters.

Other Corps programs, physically located inland, have an important influence on the coastal zone. Inland harbors and waterways feed the coastal ports and form part of the complex waterborne transportation system which moves a substantial part of our interstate and international commerce. Flood control programs on rivers that discharge into the oceans involve the coastal zone because of the riverine interaction with shore, littoral and tidal processes.

Over the years, the coastal zone missions of the Corps have grown ever more sophisticated. Some of the current assignments that particularly illustrate this sophistication are the Atlantic-Pacific Interoceanic Canal Studies, the comprehensive Chesapeake Bay investi-

gation and model study, and the in-depth study of San Francisco Bay.

These studies and investigations are multi-agency and multi-disciplinary. The involved fields include topography, geology, hydrology, meteorology, oceanology, ecology, biology, hydraulics and economics. The planning of public works in the coastal zone today is not simple, if indeed it ever was. Increasing sophistication demands increasing research effort and the knowledge gained from research further increases sophistication. The pattern is circular and endless.

The Corps is heavily committed in the research area. The Coastal Engineering Research Center and the Waterways Experiment Station are respected worldwide for their contributions to knowledge of the coastal zone. Our Great Lakes Research Center is equally known and respected by users of the Great Lakes for its continuing research into the problem unique to those great inland waters.

Currently, research efforts are looking into such diverse matters as saline intrusion, energy transfer at the air-water interface, spoil disposal effects, effects of construction activities on the ecology of the coastal zone, ice cover distribution, littoral processes, computer simulation of estuary behavior, wave generation, propagation, and attenuation, dune stabilization and many others.

With respect to the Commission's proposals for changes in Federal organization in the coastal zone and on the Great Lakes, it is our general belief that the reorganizational proposals need to be examined carefully in the broad context of Federal organization and the broad environmental and developmental context in which marine affairs must find their place. The Commission's recommendations must be weighed carefully in the light of alternative mechanisms. I will illustrate this need in my remarks on the coastal zone and the Great Lakes.

In the coastal zone, H.R. 13247 would have a new oceanic agency exercising leadership in planning, directing, conducting and supporting Federal civil activities on the waterward side.

In our experience, for comprehensive consideration of the values and problems in the coastal zone, it is very desirable to have an integrated treatment emphasizing both landward and seaward components of this very complex area. The landward importance of this important geographic area is illustrated by the fact that over 40 percent of our people and 12 of our 13 largest cities are located in counties which touch the ocean or the Great Lakes.

The problem involves a multiplicity and diversity of resource, urban, economic, environmental and other people-oriented considerations. It seems unlikely to us that a single Federal agency can satisfactorily take all these factors into account. It seems to use that some type of interagency coordinating mechanism will be required to provide the necessary multidimensional, comprehensive consideration to the zone's water and related land resource problems.

One of the existing interagency mechanisms which should be given careful consideration in the necessary weighing of alternatives, is the Water Resources Council.

The Council, organized under Public Law 89-90, consists of the Departments of Agriculture; Army; Health, Education and Welfare; Interior; and Transportation; and the Federal Power Commission.

The Departments of Commerce and Housing and Urban Development are associate members and the Department of Justice and the Bureau of the Budget are observers. Federal-interstate river basin commissions, established at the request of the State Governors, are now functioning in 15 of the 30 coastal States and alternative Federal-State planning coordinating mechanisms are active in the remaining coastal States.

The Federal agencies of the Water Resources Council are working with the States in these mechanisms, under the general leadership of the Council, in various stages of incipient or active comprehensive planning for the Nation's water and related land resources, both coastal and inland. The planning projects population, economic and environmental considerations to the year 2020 and proposes coordinated measures to satisfy the projected needs.

Notwithstanding the need to consider alternatives such as the one I have just illustrated, we recognize that if a new independent Federal agency is created to meet broad oceanic needs, such an agency would have an obvious interest in the coast. A good way for this agency to influence coastal decisions might be for it to become a member of the Water Resources Council and the Federal-interstate field organizations now working activity with it.

The problems of the Great Lakes are of major national and regional importance, but placing them primarily under the leadership of an oceanic agency may not facilitate their solution. These problems are not basically oceanic in character.

The lakes form one large, interconnected river basin system. In their hydraulic, biologic, water quality and legal aspects they are much more closely related to rivers and inland lakes than they are to the world ocean. Most approaches to their eutrophication problems envision the control of pollution on their tributary rivers and the use, as pilot models, of smaller eutrophying inland lakes to provide a practical base for needed experimentation.

The Great Lakes Basin Commission, under the leadership of the Water Resources Council, is currently engaged in a major, long-range, coordinated, interagency, Federal-interstate program of comprehensive planning considering both the landward and lacustrine problems of this basin as a unified system.

I would like to provide for the record an extract from the Great Lakes Basin Commission's plan of study to illustrate the scope of its framework investigation and the integrated Federal and State membership on task forces which are now carrying out this work. See attached exhibit 1.

The members of this Commission, both Federal and State, have the requisite, basic functional authority to implement the joint plan.

Mr. LENNON. General, would it be your desire to have the exhibit you referred to incorporated into the record immediately following that paragraph?

General KOISCH. Yes, sir.

Mr. LENNON. Without objection, it shall be done.

(The document follows:)

GREAT LAKES BASIN COMPREHENSIVE FRAMEWORK STUDY

The attached "Organization Matrix of Work Group Members" has been reproduced from the plan of study for the Great Lakes Basin Comprehensive Framework Study currently in progress under the Great Lakes Basin Commission.

The titles of the 26 work groups named in the left column illustrate the scope and comprehensiveness of the study. The 18 States and agencies identified as participants show the extent of the coordination and cooperation involved. Note, for example, that every State and Federal agency is actively participating in the key Plan and Program Formulation Work Group (line 26). Also note that every State has assigned personnel to the Work Group on Fish (line 8). Michigan, with 6 members, chairs this Work Group.

ORGANIZATION MATRIX OF WORK GROUP MEMBERS

	Illinois	Indiana	Michigan	Minnesota	New York	Ohio	Pennsylvania	Wisconsin	Agriculture	Army	Commerce	FPC	HEW	HUD	Interior	Justice	Transportation	GLBC Staff
1. Climate and meteorology.....	2	1	1	1	1	4	1	1	1	2	1	1						
2. Surface water hydrology.....		1	1	1	1	3	1	1	1	1	6							
3. Geology and ground water.....		1	1	1	1	5	1	1	1	2	2				1			
4. Limnology of lakes and embayments.....			3	2	1	6	1	1	1	2	2				1			
5. Mineral resources.....	1	1	4	2	1	5	1	1	1						1			
6. Water supply (a) municipal.....		1	1	1	1	8	1	1	1	2			1					
6. Water supply (b) industrial.....			1	1	1						1		1					
6. Water supply (c) rural.....			5	1	1	1	1	1	1									
7. Water quality and pollution control.....		1	3	2	1	19	2	1	1	2	2				1			
8. Fish.....	1	2	16		1	5	1	2	1	2					4			
9. Navigation, commercial and recreational boating.....	1	1	4	1	1	8	1	1	1	15	1							
10. Power.....			2	1	1	2	1	1	1	2		1						
11. Level and flows.....			3	1	1	2	1	1	1	16		1						
12. Shore use and erosion.....	1	2	3	1	1	2	1	1	1	16								
13. Land use.....			6	1	1	9	1	1	1	2								
14. Flood plains.....		1	4	1	1	3	1	1	1	16								
15. Irrigation.....			4	1	1	2	1	1	1	2								
16. Drainage.....			3	1	1	3	1	1	1	2								
17. Wildlife.....		1	3	2	1	5	1	1	1	2					1			
18. Sediment and erosion.....			5	1	1	4	1	1	1	2					1			
19. Economic and demographic.....			1	1	1	6	1	1	1	12								
20. Federal and state: Policies, plans, and procedures.....			14	1	1	4	1	1	1	1						1		
21. Recreation.....	1	1	3	2	1	10	1	1	1	1			1					
22. Aesthetic and cultural.....		1	5	1	1	6	1	1	1						14			
23. Health aspects.....		1	1	1	1	7	1	1	1	2			1		12			
24. History.....			1	1	1					1								
25. Water and land requirements.....			3	1	1					2								
26. Plan and program formulation.....	1	1	1	2	1	1	1	1	1	2			1	1	1	1	1	

1 Includes chairman.

General KOISCH. With respect to the U.S. Army Engineer District, Lake Survey, the proposed transfer to the new oceanic and atmospheric agency would not appear to be desirable considering the basic inland nature of these lakes. Should such a transfer nevertheless be made it, would be advisable to allow more executive flexibility in its implementation than H.R. 1-3247 now allows.

In summary, we believe that the Commission's proposal for a new oceanic and atmospheric agency needs to be tested against alternatives within the broad context of Federal organization and the broad environmental and developmental context in which oceanic affairs must find their place.

Alternatives which should be considered include (1) an inter-agency approach which comprehensively interrelates the many complex aspects of the coastal zone's landward and seaward components and (2) a reflection on whether the important problems of the Great Lakes can better be resolved by an agency or interagency group with an oceanic or inland orientation.

I appreciate this opportunity of appearing before the subcommittee and shall be happy to answer any questions you may have.

Mr. LENNON. Thank you, General.

Before I move to the other members, in connection with your statement in the last two lines on page 5, "Should such a transfer nevertheless be made, it would be advisable to allow more executive flexibility in its implementation than H.R. 13247 allows," we would appreciate your furnishing to counsel for the committee, after conferring with your legal staff and the legislative draftsmen staff, any suggestion that you might have as a vehicle.

I am not implying that the committee is running headlong into this, but we would like to have for the consideration of the counsel and members of the committee any alternative revisions of what is projected into this.

You are one of the first witnesses who has indicated that you don't like what you see but, if it comes, consider this. That is what you are saying in so many words.

General KOISCH. Yes, sir.

Mr. LENNON. We like that approach. If you would have your legislative counsel furnish to the counsel of this committee any suggested changes that you would like this committee to use as a vehicle in its deliberations, we would appreciate it.

(The information follows:)

SUGGESTED AMENDMENT TO H.R. 13247

We suggest that needed executive flexibility could be assured by revising the paragraph of H.R. 13247 relating to the Lake Survey (beginning on line 20, page 19) to read:

"So much of the mission assigned as of July 1, 1969, to the United States Army Engineer District, Lake Survey, as the President may direct, is hereby transferred to the Agency; and there are hereby transferred to and vested in the Administrator all such functions, powers and duties, relating to such mission, as the President may direct, of the Secretary of the Army and of other officers and offices of the Department of the Army."

This approach would keep the bill clean of cumbersome legislative detail and allow the President the necessary flexibility to tailor a transfer in such a way as to produce the best overall organizational solution—considering the responsibilities of both the receiving and the losing agency.

The role of the Lake Survey District relates very closely to the overall mission of the Corps of Engineers on the Great Lakes. This mission is carried out by the U.S. Army Engineer Division, North Central and its five Great Lakes districts—Buffalo, Detroit, Chicago, St. Paul, and Lake Survey. The mission includes basin planning, design, construction, operation and maintenance of improvements for navigation, flood control, and beach erosion; and also participation in joint U.S.-Canadian investigations and regulatory operations related to the Great Lakes system. The Lake Survey District also provides engineer consulting services to the international boards and committees directing the use of Great Lakes waters and, as part of the Corps of Engineers, participates in cooperative investigations with other U.S. and Canadian agencies. The Lake Survey District provides a considerable amount of project level support to the Corps of Engineers Districts committed to the Great Lakes and conducts much of the research related to the Corps' overall mission on the Lakes. The highly skilled civilian cartographic technicians employed by the Lake Survey District provide an immediately available, flexible capability to meet sharply increased demands for maps to support military commitments around the world.

Specific and detailed identification at this time of those functions of the Lake Survey District that could appropriately be transferred to NOAA might be legislatively cumbersome and the resultant inflexibility might well handicap both NOAA and the Corps of Engineers. Deferral of such identification until missions can be examined in the full context of final alignments and organizational mechanisms seems both proper and prudent. A few examples of some of the impacts of mission transfers illustrate the types of interface problems that require detailed consideration.

The Lake Survey District's responsibilities in surveying for, and compiling and publishing, navigation charts are not confined to the Great Lakes but also include New York State Barge Canals, Minnesota-Ontario border lakes, Lake Champlain, and outflow rivers. Imposition of these responsibilities on NOAA seems inconsistent with the role assigned it by H.R. 13247.

The research mission of the Lake Survey District focuses primarily on applications. Unless NOAA is to have a navigation, beach erosion, and flood control project mission, transfer of the research mission would separate the Corps from the applied research on which its project development depends and thereby introduce a need for a coordinative mechanism where none is now required.

The Lake Survey District provides consulting engineer services to international boards and committees operating on the Great Lakes. Much, but not all, of this mission derives from Corps' membership on these boards and committees. Staff engineers consulting for these boards and committees also support other Corps of Engineers Districts with project missions on the Great Lakes. Transfer of the consulting engineer service mission to NOAA would probably cause NOAA and the Corps of Engineers to maintain some duplicate staff.

Mr. LENNON. Mr. Keith.

Mr. KEITH. Thank you, Mr. Chairman.

Mr. LENNON. It might be well, Mr. Secretary, if you would just come forward and join the general at the witness table and then the members may identify the witness to whom they direct the questions.

Mr. KEITH. The observations of the witnesses that we have had here are most enlightening and most provocative. There is only a limited time that most of us, with our varied responsibilities, can give to this. So we are very grateful for the in-depth research and recommendations that you gentlemen are making.

I feel very inadequate, particularly as I am somewhat handicapped by a bursa that has been requiring codeine for the last week. But I would like to ask you, general, just to show how provocative I can be, who killed Lake Erie?

General KOIRSCH. I think, sir, in terms of who killed Lake Erie, I would have to say the people. I would also like to point out, however, that even if there were no people, in time, Lake Erie would die.

Mr. KEITH. What I have in mind in asking this question is that had there been a NOAA, in addition to the Engineers and the River Basin

Commission or the Great Lakes Basin Commission, plus perhaps this Environmental Council in which we have been so interested here, it is possible that we would have been a better nation. There might have been talents, in such agencies to gage the impact of that tremendous development in the Great Lakes, the St. Lawrence Canal and also the impact that it had all along that route.

I have been very impressed as I have met with the Commission that has been studying this under Dr. Stratton. I have a great admiration for the depth of their study and their conclusions.

The cumbersome nature of the existing agencies dealing with our environment leads me to believe that it couldn't help but be improved—at least as far as the oceans are concerned—by a development such as the Commission proposed.

In Dr. Frosch's statement he said on page 15, referring to the territorial sea question:

As indicated previously the DOD attaches great importance to the settlement of the territorial sea question prior to submitting any initiative on the seabed problem. The main reason is because the limited jurisdiction of the coastal states, insofar as seabeds are concerned might be extended unilaterally to include other rights if there is no firm prior international agreement on the extent of total sovereignty.

Representing as I do, the State of Massachusetts, and with our great interest in the sovereignty of the that coastal zone, how does your statement relate to that?

Dr. FROSCH. Well, I think "States" in this statement of course refers to national States. I think the fear here is that, if the boundaries of some form of jurisdiction were to be established, for example, by some form of individual nation's assertion of its control, even if that nation's attempt to establish it by assertion were rather circumscribed and sort of responsible and narrow, this might well be followed by a number of assertions by other countries which were entirely in terms of their self-interest so that we might end up with a large collection of individual assertions which would then be acted upon unilaterally and we would find ourselves in a situation where it would be extremely difficult to negotiate anything.

It seems to us to be much preferable to try to negotiate a general agreement on what reasonable boundaries for various kinds of jurisdiction and particularly for coastal waters and sovereignty would be.

We have seen this happen in the past. Some countries have made unilateral assertions of fishing rights boundaries and others have followed with various distances. We are in favor of attempting to negotiate some kind of a general international agreement on what the boundaries ought to be; really as a protection against getting into a chaotic situation in which the attempt to make boundaries is by individual assertion.

Mr. KEITH. Wouldn't NOAA be the best agency to reflect the national interest as it developed a point of view for our Government in dealing with other nations?

Dr. FROSCH. If established, from our point of view it would be one of two agencies that would have major interests in the sea that would contribute toward formulating a U.S. position, the Department of Defense with its peculiar responsibilities for national security being the other one.

In any case presumably the negotiating authority and the details of international organization and negotiation would remain with the Department of State in the final analysis.

Mr. KEITH. We find that insofar as fishing interests are concerned, the State Department, although it has been better in recent years, has not been too cognizant of our problems vis-a-vis the Russians and other vessels off our New England shoreline. They might have been more attentive had there been in existence, a prestigious agency such as NOAA rather than the Bureau of Commerical Fisheries.

On page 14 you state:

We should note that these recommendations as well as other Commission proposals are being reviewed by the Administration.

Who in the administration is reviewing these proposals now?

Dr. FROSCHE. Well, the National Council has had a continuing examination of various of these proposals since the Commission report came out. As you know, there was some reconstitution of the Council's structure with the new administration and various of the proposals are being looked at by the new structure.

Mr. KEITH. You are not referring to the Ash Commission?

Dr. FROSCHE. No; this would be separate from the Ash Commission which is looking only at the organizational part.

Mr. KEITH. And it is fair to say that the agencies affected are reviewing them as they relate to their operations?

Dr. FROSCHE. Oh, yes.

Mr. KEITH. Thank you, Mr. Chairman.

Mr. ROGERS (presiding). Mr. Secretary, it is good to see you before the committee again, and you, too, General. We appreciate your being here. I am glad to see that a man with whom this committee has dealt greatly is here with you, the oceanographer of the Navy, Admiral Waters, with whom this committee has dealt in work with oceanography.

In your statement you have raised some flags, but not many as such. You said it wouldn't hurt if the data center were changed as long as it serves its function. Also I believe you said that maybe instrumentation, the testing, it would not be hurtful to change that.

As to the Coast Guard you want to make sure that it has its military functions delineated. You are not much in favor, as I understand it, of NACO. You think an interagency setup would be preferable because you don't give the constituent agencies a direct voice but simply an observed position.

I think really the Commission's idea on the advisory committee was to bring in the outside people and to have an outside view where it would not be dominated by the agencies and I think your fears are not well founded regarding the assumption that it would necessarily direct all of the programs.

It would simply be an advisory body to see what is happening to the civilian effort, the private sector, as well as governmental effort. I think that was the idea of the Commission report and in reading that again I am substantiated as to its idea in that field.

The most that I see that you are concerned with is whether we should have a new agency that would report to the President in effect, whether there would be sufficient coordination. This seems to me to be one of your great concerns, and you bring that out on page 5 that you do feel:

That some form of consolidation of marine functions leading to a somewhat smaller group of Federal organizations with major interests in the field would be highly advantageous to the national program.

Well, of course, this is what we are trying to do, and this is the effort to accomplish what you basically agree with in principle.

You talk about what is going to happen, how can we coordinate, and on page 7 you say:

The relationships between the DOD program and that of NOAA would need to be carefully coordinated both to prevent unnecessary duplication and to insure that the existence of either program could not be used as an excuse to cut the other unwisely.

Well now, presently how do you coordinate?

Dr. FROSCH. We coordinate with the other agencies in two ways: One by a great deal of direct personal contact on programs which we know are of mutual interest, and we coordinate via the machinery of the National Council.

Mr. ROGERS. And the National Council of course this committee set up.

Dr. FROSCH. Yes.

Mr. ROGERS. And it took the place of an interagency committee.

Dr. FROSCH. The Interagency Committee on Oceanography.

Mr. ROGERS. Now when you go to ESSA you presently have to go through Commerce to ESSA, right; under your present setup?

Dr. FROSCH. For a formal matter of interagency agreement we would, of course, go through the secretarial chain. For matters of interchanging program information and agreeing on mutual things that don't require formal interagency agreement, we go at the appropriate directorate level in the staffs of the two organizations.

Mr. ROGERS. And I presume you do that with Coast Guard. You either go through the Secretary or direct?

Dr. FROSCH. We do this in the same manner with all of the agencies.

Mr. ROGERS. And with the Bureau of Commercial Fisheries?

Dr. FROSCH. Yes, and of course an important and strong one is direct work between the Office of Naval Research and the National Science Foundation.

Mr. ROGERS. The point I am trying to make is that presently you must coordinate now and wouldn't it be easier if we were pulling three of these groups under one operation? Wouldn't that lessen your coordination and operation problem to have these combined?

Dr. FROSCH. Certainly it would.

Mr. ROGERS. That is what we are trying to do. Certainly. I agree with you.

Dr. FROSCH. As a matter of fact if the organization were to be set up immediately, I think one of my first tasks would be to call on the director and begin to set up that arrangement.

Mr. ROGERS. And I am sure that he would cooperate. This is what I believe this committee is going to try to help you do, to coordinate more easily with the rest of the Government in setting up an organization. I think we recognize and the Commission recognized that the Navy oceanographic effort is a distinct program from the civilian.

I think in many areas there could be better cooperation and better coordination. For instance on this use of personnel perhaps and equipment, we have just gone into that. They were trying to get a new

oceanographic vessel or two, and if it had been coordinated early enough, maybe they could have worked it in their budget.

This is a matter of conjecture of course as we don't know.

Dr. FROSCHE. The difficulty there, Mr. Rogers, is the matter of timing. We did not know that we were going to be hit with the budget pressures until they were already hit with the budget pressures, too.

Mr. ROGERS. I understand. Mr. Chairman, I hope that we can have before this committee some of the Bureau of the Budget, perhaps the individuals in the Bureau of the Budget, for instance, that handle the oceanography program for each department. These are the men I want to talk to because evidently they are overruling all of our experts who make the recommendations, and I know for a while there in Defense I think they had a former captain and maybe somebody else who was overruling the Joint Chiefs of Staff.

So I hope before our hearings are over, Mr. Chairman, we can get these individuals who seem to be telling every agency just what you can do and what you can't to come before this committee. We can then find out some of that background and how these decisions are made because obviously they are the most important decisions made in these ongoing programs.

I think your testimony has been most helpful. You have brought out some points that I think we need to consider, and I am glad that the Navy really is fairly openminded about this and has made some very constructive points.

Thank you.

Dr. FROSCHE. Thank you, Mr. Rogers.

Mr. LENNON (presiding). Thank you, Mr. Rogers.

Mr. Dellenback.

Mr. DELLENBACK. Thank you very much, Mr. Chairman.

I have appreciated this testimony, as has been expressed by other members of the committee, from both you, Dr. Frosch, and from you, General Koisch. Sometimes the very best way that one can examine a suggestion made is when one isn't sitting down with somebody who says what a great suggestion it is, but rather one who says, "We think this has weaknesses and these are the weaknesses."

I think probably each of you would be subject to crucifixion within your Departments if you stepped out here and said, "This is great and far better than what we have at the present time." I am neither surprised nor at all concerned adversely by these comments that you have made. I consider much of it as highly constructive testimony.

I would ask either of you this because in both instances there is partly a thrust of talking in terms of both testing against alternatives, which you both spoke of, and you have also talked in terms of possible, not certain, but possible desirability of an interagency approach rather than to create a new agency like NOAA.

Dr. Frosch, let me ask you this. Do you think that the present coordination in this field is ideal, excellent, good, fair, poor? How would you rate it?

Dr. FROSCHE. I think if I may chose another word, I would rate it as workable. It is operating. It is certainly dealing with the severe problems.

I would certainly not rate it as ideal or excellent, and I think it is true that with the number of agencies that have mission responsi-

bilities in the area it is hard to see how one could produce an ideal coordination pattern because so many of the individual problems involve the missions of more than one agency.

Mr. DELLENBACK. Recognizing the difficulties, recognizing also the importance and recognizing the split responsibility of the Navy between the military and the civil because the Navy's reach is broad in this field, do you feel that that which is workable at the present time should be improved?

Dr. FROSCH. Oh, yes.

Mr. DELLENBACK. Do you feel it can be improved?

Dr. FROSCH. Yes, I think it can be improved.

Mr. DELLENBACK. Do you feel that it would be desirable that we make a major change or major improvement at least in the emphasis in the area of national priorities directed to the broad sweep of what is involved in this general subject under consideration, or would you make peripheral, relatively minor additional emphasis attached to it?

Dr. FROSCH. I think we need some considerable improvement in emphasis in order to do the jobs that are clearly already important. It is not clear to me that we should attempt to make the oceans a major, or the major national priority. I think this would be a little like pushing on a string.

Mr. DELLENBACK. Are you making a distinction between a major and the major?

Let's not say the major. Do you say that you would not make the oceans and the atmosphere a major project?

Dr. FROSCH. It is hard for me to put this in my own mind on a list in terms of where major begins. It is clear that we have important jobs to do and important dependencies on the ocean and the atmosphere. I think it is clear that over the next decade the ocean is in many ways going to become more important to us than it has been in the past.

I think what I am trying to wonder about a little bit is at exactly what rate we should try to expand the priority and the nature of work in this area.

Mr. DELLENBACK. Would you make the expansion an implemental one or would you make it a great leap forward?

Dr. FROSCH. I think at this point I would be most concerned about improving the organizational arrangements and the efficiency of what we are now doing with some incremental increase, but I think until we do that and get ourselves sorted out by some mechanism or other so that we understand where we want to go that an attempt to make a great leap forward might lead us into considerable difficulty.

Mr. DELLENBACK. This is important because I am not sure, you see, that we are really then seeing eye to eye on this because if I read correctly what you are telling us, then I think that I as one member of the subcommittee may have a real, basic, fundamental, underlying point of disagreement with you.

If what you are talking about is really business as usual on this broad-sweep area with all its complexity, and maybe improvement of a peripheral nature, advance of a peripheral nature, revising that which is but not really fundamentally changing it, then I am not persuaded that we can really effectively accomplish great results in connection with the ocean and atmosphere in this manner.

I think we are going to have to make some significant leap forward. I would put a question to you, and yet I suppose it is unfair. Don't answer it if you would prefer not to. I may still put it. Would you rank in the area of major national priorities further great strides forward in the area of space exploration? Would you rank that above a major effort in the field of exploration and research and movement forward in the area of the atmosphere and the ocean?

Dr. FROSCH. If I may express a personal opinion.

Mr. DELLENBACK. Please.

Dr. FROSCH. I would not personally rank a major space effort above a major effort in the oceans and atmosphere, but please—

Mr. DELLENBACK. You would rank the ocean and atmosphere above that?

Dr. FROSCH. Yes, I would rank the ocean and atmosphere above that, but please understand that I don't mean this to imply that either one of them should necessarily be zero or close to zero.

Mr. DELLENBACK. My question was deliberately aimed at not putting them at zero. I was concerned with ranking of a personal nature because this is obviously not a departmental opinion. But you in those circumstances would put a major effort in the atmosphere and oceans ahead of a further major effort in space?

Dr. FROSCH. Yes, I would, but I think it is only fair to point out that as a professional I have been engaged most of my professional life in the ocean.

Mr. DELLENBACK. The Chairman didn't really ask this question, but he made a comment on it in response to what was said by another committee member. I don't think this is the forum to develop it, but the relatively recent attempt to amalgamate the Navy, Army, and Air Force under the Department of Defense was analogous because at the time this great leap forward was made there was great debate whether there would not be great injury to the individual component services in carrying out their functions. I won't ask any of the professional officers present to comment as to whether the solution has been ideal today or whether they feel there are not still rough edges to the amalgam.

I think if we had private conversation with each branch of the service represented, there might be a minor issue or two, but that doesn't mean that the totality of service to the nation has not been improved by this.

I think there is a real analogy, you see. It was a major step in the military field to do this. The decision was to do it. I think probably the consensus of opinion would be that the Nation has benefitted by this, with all the rough edges and all the difficulties.

I think the problem we are facing now in the committee is the question of whether in the field of the oceans and atmosphere the same sort of nonperipheral great leap forward is not essential.

Frankly, I was a former Navy man, but for a relatively short time of 4 years. I feel very warmly toward the Navy and its concerns. I am very sympathetic. As one who works closely with the Army Corps in my district where they are involved with a great number of projects, I have great praise for the Army Corps in what is in many ways a civilian function, General, that the Army Corps serves instead of a military function. I think the Corps itself bridges very well this gap be-

tween the military and civilian with all sorts of concomitant again, rough edges and problems.

So that none of these things come easily, but let me ask you, General, the same thing as I just asked the Secretary. Where do you feel that the present coordination is on this ranking of perfect or ideal or excellent, good, fair, and poor? Where would you put the present type of coordination of ocean and atmosphere?

General KOISCH. In the subject that we are discussing I think you have to recognize that our experience in what you might call the deep ocean as against the coastal zone and Great Lakes is relatively nil, so that I can only speak in terms of the coast zone and the Great Lakes.

We find the coordination essentially to be excellent and yet you must realize also that there are a great many conflicts involved.

Some of the things that we are doing are in direct conflict with Interior's aims in life, and yet there is coordination. We do talk to each other. We discuss the problems, who is going to fund for what things for study.

Mr. DELLENBACK. There is a great deal of cooperation as well as coordination?

General KOISCH. I repeat again that I am talking only in terms of the coastal zone and Great Lakes.

I have no experience in the deep ocean as such.

Mr. DELLENBACK. But you find it to be good at the present time?

General KOISCH. And there are other checks on us. The final check you might say comes out at the Bureau of the Budget. So there is no duplication in that sense. Who is suggesting to pursue what program comes out from discussions among agencies. In the things that go to the Marine Council and the programs that are pushed, we find some lack of what one might call a truly positive statement of the national goal in this area.

Mr. DELLENBACK. I question whether that might not be forthcoming more readily under a coordinated agency than under the present agglomeration of more or less many agencies.

May I close, Mr. Chairman, by backing very strongly the request you made earlier that we ask both the Army Corps, if we may, and also the Navy to supplement testimony, if they would do so, against what you, General, put as your basic choice would be perhaps not to do this, but if we did it, what specific changes or what specific suggestions would you make relative to the plan that is set forth in the bill that is under consideration? While there is some of that involved in your testimony, I think it would be valuable to us to get an amplification if we can do it both from the Department and from the Corps, if you will give us that additional help.

General KOISCH. We would be happy to do it.

Mr. DELLENBACK. Thank you very much.

(The following information was supplied by the Department of the Navy:)

Under the circumstances that the question was asked, which I understand to be that if there is to be a NOAA, what changes in H.R. 13247 should be made, the following is submitted:

(1) Page 6 line 24 after the words "marine environment" insert "(as delineated by the provisions of the act of August 6, 1947 ch 504, as amended (33 USC 883a et seq.))"

Reason: This is necessary in order to clarify respective areas of mapping and charting responsibilities, to avoid an unnecessary duplication of effort between the Navy and the National Oceanic and Atmospheric Agency, and to be in consonance with the considered recommendations of the Commission on Marine Science, Engineering and Resources.

(2) Page 7 line 6 add section (12): "Department of Defense atmospheric and oceanographic research, development, information, surveys, forecasting, mapping and charting and other related services not specifically transferred to the Agency remain the responsibility of the Department of Defense."

Reason: This is in order to clarify lines of responsibility or function between the National Oceanic and Atmospheric Agency and the Department of Defense as was suggested by the Commission on Marine Science, Engineering and Resources in its report.

(3) Page 8 line 21, delete "(A)".

Page 9 line 4 through 11, change comma after "Code" (line 4) to a period and delete the remainder of the sentence.

Reason: NOAA personnel should not receive better treatment than that afforded civilian personnel in other departments and agencies in the Federal government. The proviso in the bill is not compatible with the principles of classification under title 5, U.S. Code.

(4) Page 8 line 24. The maximum number of personnel who may be appointed without regard to civil service and classification laws is left unspecified. Obviously, there is a small number which would be appropriate. There is, on the other hand, a large number which would provide NOAA with an unfair advantage in the competition for competent talent. This number should be carefully chosen to insure a proper balance between NOAA's need and the needs of other agencies.

(5) Page 16, line 22 through 25, page 17 lines 1 and 2. Delete the sentence "The Advisory Committee . . . as it deems appropriate."

Reason: The function of NACOA is to *advise* NOAA. The provision in the bill for NACOA to submit reports provide NACOA with a degree of authority which is incompatible with its responsibility. It is noted that the Administrator of NOAA makes a report at the end of each fiscal year to the President for submission to the Congress. (Sec. 104(e)). It would be improper for NOAA's advisory body to be submitting additional reports.

(6) Page 18 line 18, add the sentence "The Coast Guard shall be maintained in an adequate state of readiness as a member of the Armed Forces of the United States, as specified in 14 USC 2."

Reason: Inasmuch as the Coast Guard fleet will be combined with those of ESSA and BCF, some statutory provision for maintaining the Coast Guard in a state of readiness for transfer to the Navy is deemed appropriate.

(7) Page 20 line 8 add "and the National Oceanographic Instrumentation Center."

Reason: The NOIC is inadequately treated in the bill. NOAA would appear to have some of the NOIC missions, and the bill as written would automatically create unnecessary duplication.

Mr. LENNON. Mr. Downing.

Mr. DOWNING. Thank you, Mr. Chairman.

Mr. Secretary and general, I think it fairly obvious that you all are less than overenthusiastic about this proposal, and I agree with Mr. Dellenback that much the same arguments against it could be found when the Armed Forces were consolidated under the Department of Defense.

But, you know, although I disagree with you, I must begrudgingly admit that you have submitted an excellent report and some of your points have to be taken into consideration. I find myself reluctant to admit that, but I think you have made a contribution here today.

General, your answer to Congressman Keith's question as to who killed Lake Erie was both interesting and provocative. I understood you to say that the people did, and did I understand you to say it would have died anyway?

General KOISCH. Yes, sir.

Mr. DOWNING. Why?

General KOISCH. It is the natural life cycle of a lake. It would eventually eutrophy, dry up, and disappear.

Mr. DOWNING. Is that true of the other lakes?

General KOISCH. Yes, sir. This is the normal life cycle of a lake.

Mr. DOWNING. Thank you very much.

Mr. LENNON. Thank you, Mr. Downing. I think it was in the first session of the 87th Congress that this subcommittee considered essentially what we are considering now.

Suppose, gentlemen, Mr. Secretary and general, that in substance there had been enacted into law what we propose here in the Commission's recommendations back in, say, the second session of the 87th Congress which would have been 1962 I should judge. Where do you think we would have been today with respect to a program for ocean science and environment?

Mr. Secretary, would we be further advanced now than we are today?

Dr. FROSC. Predicting past history is always a difficult thing to do, but I think that from the point of view of the national marine program we would have probably a better consolidated program and very likely a program which had settled on some specific directions more than the current program and was carrying them out.

I think the real question that Mr. Dellenback asked and that is whether from the overall point of view of national aims strengthening the ocean program would be generally nationally good and whether it would come at the expense of other mission-oriented things.

For example, while such an agency might have strengthened, let's say, sea bottom mineral resource exploration and exploitation, one has to ask the question whether this would have left exploration and exploitation on the land alone, whether it would have given it a stimulus or whether the exploration and exploitation at sea might have come at the expense of exploration and exploitation on land; and, having estimated the answer to that question, we would then have to decide whether that was a net gain or a net loss for the country.

I have no way of doing that, but certainly from the point of view of marine affairs as such there would be a strengthening.

Mr. LENNON. Suppose that in 1958 there had been nine Federal agencies involved in programs related to space. Do you think we would have put a man on the moon if we continued those nine agencies interested in various aspects of the space program?

Dr. FROSC. No, I don't think so, if for no other reason than it would have been impossible to assemble the budget capable of doing it if there were nine agencies working on the problem.

Mr. LENNON. That is one of the points we have here, to get the national impact budgetary-wise.

General, on page 3 of your statement you enumerate what you say the problem involves and more specifically you say:

The problem involves a multiplicity and diversity of resource, urban, economic, environmental and other people-oriented considerations. It seems unlikely to us that a single Federal agency can satisfactorily take all these factors into account. It seems to us that some type of interagency coordinating mechanism will be required.

Was it in approximately 1899 that the Rivers and Harbors Act gave the Corps of Engineers the statutory authority respecting the issuance of permits for dredging in so-called navigable waters?

General KOISCH. Yes, sir.

Mr. LENNON. The words "navigable waters" have been interpreted in many ways by the courts. I think you all got along pretty well until when?

General KOISCH. About 3 years ago, sir.

Mr. LENNON. Under an Executive order in 1967, wasn't it, in about August or September of 1967, you entered into a memorandum of understanding with the Secretary of the Interior?

General KOISCH. Yes, sir. It is about 2 years old.

Mr. LENNON. You said in response to a question that that had worked out real well.

General KOISCH. Insofar as the mechanism of attempting to, let's say, resolve the problem which comes up. The answers that come out of it are not always satisfactory.

Mr. LENNON. It places the burden on the district engineer, does it not?

General KOISCH. The proper answer is that it does not place the burden on the district engineer. The burden comes to rest in the Office of the Chief of Engineers and the Secretary of the Army.

Mr. LENNON. Ultimately it does. Let me see if I can recollect a specific example of it. I am thinking of a certain group who applied for a permit to dredge in the coastal area of southeastern North Carolina some 2 years ago. There was no opposition by the State and there has yet been no opposition in writing by the State. That particular case has been at the level of your office for some little time.

General KOISCH. Yes, sir.

Mr. LENNON. And in the exchange of correspondence which I have had with your office, sir, and with the Department of the Interior there have been as much as 90 days where you couldn't get an answer from the Department of the Interior. If you don't believe that, I will bring you the letter.

General KOISCH. Sir, I remember the case. Ninety days, I might say, in some of these cases is fast.

Mr. LENNON. That is fast? That is to acknowledge the letter, I might say. So it does seem to me that as to the procedural aspect of this memorandum of understanding, I don't know how it can be carried out. It hasn't in this case. Literally it can be carried out with respect to the hearing and so forth putting it back down to the regional director of the Department of the Interior to make this report to the Secretary and then it goes back to you and back to the Secretary and back to you and back to the regional director.

I am just wondering if you had a central government agency which had the total responsibility if these problems could not be better solved. When we get involved in coastal zone questions that were raised by the Commission, we do get impaled on the horns of not one but more than one dilemma. I think you know, General, that this committee is starting something that I don't know has been attempted before, and that is to convene here in Washington on the 28th and 29th of October, through the respective Governors of some 30 coastal and Great Lakes States, their representatives from their respective marine

science councils. I might say that this committee 2 years ago suggested they form such marine councils.

We are inviting these representatives here so that people like you, who have wrestled with this problem for years, can make your views known. I am going to ask counsel to discuss with you at some length the possibility of getting a position paper by the Department of the Army through you at this forum.

These forums will be moderated by men like Dr. Edward Wenk, just to mention one, and many others. The panelists will represent a broad spectrum of people who are interested in the recommendations of the Commission, and we are seeking a way to tell these people how far the Federal Government should go under the recommendations of the Commission and to what degree the coastal States and Great Lakes would be willing to come in and participate in an overall program such as you gentlemen have discussed here today.

I would like very much for you to give us the benefit of your experience because I know it has been wide, and particularly in the area of civil works which is in this category.

We will be back in touch with you because I think it has been indicated that this committee has been involved in this thing for years, General and Mr. Secretary. We have met with frustration in trying to even pass the law that we did which created the Commission and the National Council. The administration resisted the creation of the National Council saying we didn't need it and it was repetitious, and within 6 months Vice President Humphrey as Chairman and the other members of the Council were enthusiastic about what it was moving toward and what it was accomplishing.

We know that based on the composition of that Commission and the time, effort, and study they put forth in making their recommendations that we have a responsibility. We are mandated in my judgment to at least give attention to these matters and try to come up with some solutions.

We want you to help us and want you to understand our problem.

Most witnesses say that the Commission report projects the national interest. We want you to help us find out how to do that.

Counsel, do you have questions?

Mr. Frey?

Mr. FREY. Sir, I was in the Navy, and I think at this point I would be referred to as a "tail-end Charlie," Mr. Chairman. I would just like to say, gentlemen, that I read your statements. I was in a meeting of the Space Committee, of which I am a member also.

Mr. Secretary, your remarks seem a little out of context to me because you are saying that the program with the ocean should be at least equal to or greater than that of space. Yet we have been considering a special task force report on the next 10 or 20 years in space with funding and emphasis that are considerably different than we look at in oceanography.

Again, coming last, most of the questions have been asked.

One of my questions is: Where would we be in the space program if we had not taken this type of action and put national emphasis on it? I think your answer was direct and to the point, and I think this is the problem we face in oceanography. Is it as important as the space pro-

gram and, if so, can we really accomplish it by just "beefing up" an agency, by coordinating a little better than we have been doing?

I think this is really the key question. I agree with my colleague, Mr. Dellenback, in that I just don't see how you can do it this way. I would be most interested to see something constructive, not just against the suggestions of this committee, but something constructive as a positive way to accomplish this goal.

I think I have used up my 5 seconds, Mr. Chairman.

Mr. LENNON. I will yield to you any time.

Mr. FREY. Yes, sir. That is fine.

Mr. LENNON. Thank you, Mr. Frey.

The hearings will resume next Wednesday morning in this hearing room at 10 a.m.

At that time the witnesses will be Mr. W. D. McElroy, the Director of the National Science Foundation, and Mr. Sidney R. Galler, the Assistant Secretary for Science of the Smithsonian Institution.

Gentlemen, we thank you very much for your appearance here today.

Dr. FROSCH. Thank you very much.

General KOISCH. Thank you.

(Whereupon, at 12:10 p.m., the subcommittee recessed, to reconvene at 10 a.m. Wednesday, October 1, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

WEDNESDAY, OCTOBER 1, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY,
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:15 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The subcommittee will come to order.

This morning we are delighted to have Dr. W. D. McElroy, Director of the National Science Foundation, and Dr. Sidney R. Galler, Assistant Secretary for Science of the Smithsonian Institution.

Gentlemen, we are delighted to have you. It is my understanding that Dr. McElroy will present his statement now.

Doctor, if you will come forward, we hope to get underway. Doctor, do you have anyone with you that you wanted to identify and sit at the witness table with you?

**STATEMENT OF DR. W. D. McELROY, DIRECTOR; ACCOMPANIED BY
DR. ROBERT D. ABEL, HEAD, OFFICE OF SEA GRANT PROGRAMS;
AND DR. EDWARD P. TODD, DEPUTY ASSOCIATE DIRECTOR (RE-
SEARCH), NATIONAL SCIENCE FOUNDATION**

Dr. McELROY. Yes; with your permission, I would like to have Dr. Abel, who is head of our sea grant programs.

Mr. LENNON. We are delighted to see you.

Dr. McELROY. Mr. Chairman, I have a written statement to submit for the record. I prefer not to use the statment or read it, but rather to talk informally about some of the highlights.

Mr. LENNON. All right.

Without objection, immediately following your informal summary statement, there will be inserted in the record the full text of your statement as presented to the committee.

Dr. McELROY. Thank you.

I should preface my remarks by indicating to you, Mr. Lennon, and to other members of the committee that I am a strong advocate of oceanography, having worked in that field myself for 15 years and having served on the President's Science Advisory Committee on Oceanography. We studied this whole problem of Federal relationships over a period of a year between 1965 and 1966 and we prepared a report called "Effective Use of the Sea."

We studied many problems, and I think basically we arrived at the same position as the Commission's report with regard to effective science, that is, the scientific objectives.

However, we differed with the Commission with regard to governmental organization.

Mr. LENNON. You are speaking when you make this statement as the Director of the National Science Foundation and as a representative of the administration?

Dr. McELROY. No, sir. I am speaking personally now.

Mr. LENNON. I see. Thank you.

Dr. McELROY. I have not, even after studying the Commission's report, changed my original views with regard to the organization. I personally think that a different organization would be much more effective, less disruptive and probably less costly.

I would like to take this opportunity to divide marine science activities up into four broad categories as we originally did in our study back in 1965 and 1966. These are four basic areas which I think are covered roughly on page 4 of my prepared statement.

Mr. LENNON. Let's get the record straight since you are putting your statement in. You make the statement on page 2, beginning on line 6, "I believe that an organization of the scope envisaged by the Commission would become too unwieldy and perhaps provide more problems than it would solve."

You are speaking to this?

Dr. McELROY. Yes.

Mr. LENNON. All right, sir. Go ahead.

Dr. McELROY. I think if we look at the marine environment, we can see four categories: The environmental forecasting and services; resource development, scientific research and education; and civilian technology development.

Those are the four broad categories which cover all principal activities of marine sciences that we were able to identify. I do not believe that has changed over the past few years.

Now, when one considers marine science and oceanography from that viewpoint, I think it follows logically that existing agencies might be directed to take on the additional responsibilities that the Commission has indicated.

For example, I think Commerce with ESSA could expand its activities to undertake the problems with regard to environmental forecasting and services, and particularly to establish a national environmental monitoring and prediction program which is one of the high-priority recommendations.

In effect, ESSA is carrying out at the present time most of the activities identified in the Commission's report in this regard.

In the case of resource development, I think that interior, given additional direction, could effectively carry out the missions identified by the Commission's report including the expansion of the Bureau of Commercial Fisheries and undertaking other resource activities.

The civilian technology development could logically be assigned to interior, and in this case I think with cooperation from the Navy with their technology knowhow, it would make a significant contribution to civilian purposes, augmenting that which has actually been carried out over the years.

Scientific research and education should reside with the National Science Foundation which, I think, and I can say without prejudice since I was not here at the time, has done an outstanding job in advancing scientific research and development in the oceans.

The Commission did not disagree on this as a matter of fact. The Commission identified the National Science Foundation as the leader in ocean research and education, and I think, frankly, it would be a critical and almost disastrous mistake to remove this area from the rest of the educational components of the universities and colleges and give the responsibility to another organization.

Ocean research and education are the critical underpinnings of all the other three activities that I have mentioned above, and this, I submit, must be kept intact.

The Foundation also is affected greatly by a number of other recommendations in the Commission's report. For example, it would remove the Antarctic program. It would remove NCAR. It would remove the institutional support that we now give to a number of large oceanographic institutions, and it would remove the National Sea Grant and College program.

All of these programs are in direct support or closely related to the research and graduate training conducted in the universities and colleges.

A new agency, that, by tradition or experience, has not worked in these areas, would be asked to take on, these responsibilities, and I say when you have a good thing going, as we have now, I question whether it should be disturbed, but rather it should be improved to meet the national growing needs of the additional research and education in the oceans.

One area, though, that I am particularly concerned about is the Sea Grant College program, that I hope Mr. Abel will have a chance to answer questions on.

NSF has made a large investment in the support of oceanographic institutions. For example, the Commission recommends a system of federally supported university national laboratories.

Mr. LENNON. Let's return for a minute, doctor, to interrupt you when you said that you wanted Mr. Abel to speak to the national sea grant program.

Dr. McELROY. I would be happy to have him answer any questions or to make a statement if you desire, Mr. Lennon.

Mr. LENNON. One of the difficulties in having a statement made off-the-cuff or a summary of your statement is that it does not give the committee an opportunity to follow your statement and to subsequently question you in connection with your statement.

If you summarize and then put your statement in the record, which we have agreed to do because we want to accommodate you in the interests of your time and the committee's time. It does put the committee at a disadvantage however, unless, while you are summarizing, they can go back and read your statement.

Dr. McELROY. I understand.

Mr. LENNON. I bring this to your attention because I have read your statement hurriedly, standing out in the hall a few minutes ago, but I doubt if other members have had that chance.

I quote: "I am deeply concerned with the report's recommendation regarding the National Sea Grant program."

Then you make a confession which few people do:

I must confess that, personally, I had earlier entertained doubts as to the feasibility of such a program as it was originally proposed. However, the Sea Grant Program has made significant and rapid progress.

Then you go on to tell what a great job it has done. Yet you opposed it at the time?

Dr. McELROY. Originally.

Mr. LENNON. As you are opposing now the Commission's recommendation?

Dr. McELROY. I opposed it as it was originally put forward prior to passage of the act, and I submit that the innovations that the National Science Foundation has made in carrying out the program have resulted in a significant contribution from what I envisioned from the original proposal. I am in complete agreement with the present sea grant program.

Mr. LENNON. You may proceed.

Dr. McELROY. At the present time we are block funding, and have been since 1966. The ship operation support for the oceanographic institutions, as for example, Woods Hole, Scripps, Lamont, Miami, Washington, Oregon State, Hawaii, and others. This "block funding" and the oceanographic research conducted by these institutions already carry out some of the recommendations that are in the Commission's report.

We recognize this as a very important activity, and I am prepared to say that the sea grant program itself has added significantly to these research activities.

I will close this informal statement, and we can go back to the prepared statement, if you would like.

Mr. LENNON. You go ahead, Doctor.

Dr. McELROY. I would like to add that at the present time the sea grant program has extremely close relationships with Interior, ESSA, the Agricultural Extension Service, and the Army Engineers, and we think the program is moving ahead most significantly. We would hate to see the program disturbed.

This concludes my very informal summary of what I think are the highlights of the points I wanted to make in my formal statement, and if you would like to go over the formal statement page by page I would be glad to take the time to do that, Mr. Lennon.

(The prepared statement follows:)

STATEMENT OF DR. W. D. McELROY, DIRECTOR, NATIONAL SCIENCE FOUNDATION

Mr. Chairman and members of the Subcommittee on Oceanography, it is a pleasure to appear here this morning to discuss the Report of the Commission on Marine Sciences, Engineering and Resources, entitled *Our Nation and the Sea*, and H.R. 13247. I have followed the Commission's activities with considerable interest since my participation in the activities of its predecessor, the President's Science Advisory Committee's Panel on Oceanography. As you are aware, our published report, titled *Effective Use of the Sea*, was used as a reference document by Dr. Stratton and his Commission members.

Since becoming Director of the National Science Foundation on July 14, 1969, I have read the Commission report and the panel report on *Science and Environment*. I greatly admire the comprehensive and thorough efforts of the Commission members, and your own foresight in establishing the Commission. The Commission has made a great contribution toward analyzing and defining our national goals in the marine environment and in pointing out the programs needed to accomplish these goals.

The Commission report presents excellent guidance for further development of oceans sciences. Oceanic development can contribute to our economic growth, international cooperation, and our prestige among the nations of the world.

Most of the attention of your Committee and the scientific community has focused on the Commission's recommendations regarding governmental organization. It is in this regard that speaking for myself, and not for the Administration, I must express certain reservations regarding the advisability of following the Commission's recommendations. I believe that an organization of the scope envisaged by the Commission would become too unwieldy and perhaps provide more problems than it would solve. I recognize, of course, the breadth and depth of the Commission's deliberations. However, I am not persuaded that all aspects of marine science can be welded into one agency without some of its components drastically suffering. I would be particularly concerned about the health, well-being, and advancement of our national scientific research and scientific education potentials in the marine sciences.

The Commission concluded that additional effort should be given to civilian marine technology so that methods of exploiting resources of the sea can be brought to the point of commercial application. The National Sea Grant Program now focuses on this area, but does not fully satisfy this need. With respect to civilian marine technology I should add that I often have wondered how thoroughly the Navy's vast, longstanding and expert technological efforts in the oceans have been analyzed to determine just how much they can contribute to our national oceanographic effort. Perhaps such an analysis would reveal information and developments that are useful for civilian purposes.

The Commission has noted that the marine and atmospheric environments are intimately related, particularly in regard to world-wide weather conditions. The scientific research and resulting technology in weather prediction and monitoring must be continued on a high priority, perhaps more for our activities on land than at sea. Therefore, I would be somewhat apprehensive about assigning the responsibility for scientific research and technology relating to the atmosphere to an agency whose primary role is in the oceans. If this should be done, I fear that our existing and future progress in atmospheric monitoring, prediction, and control over our land masses will be adversely affected and that our programs in agriculture, air pollution, and weather prediction will suffer. I recommend further study in this area.

From my experience on the PSAC Panel on Oceanography, I am personally concerned over the Commission's failure to present alternatives to its proposed organization. Certainly, many alternatives were considered. It is not my intention to assess the Commission's work in a negative manner, but I believe there are alternatives that would be much less costly and disruptive and if employed would accomplish our national objectives. One alternative that requires additional consideration is the concept of having an appropriate Federal agency responsible for each main category of marine-related areas of activity corresponding to the Nation's interests in civilian marine affairs. (Military affairs and international affairs should be considered, of course, as separate categories.) These main categories are (1) environmental forecasting and services; (2) resource development; (3) scientific research and education; and (4) civilian technology development. Such categorization is not only comprehensive and logical, but would suggest, almost by definition, the proper nuclei for assignment within the Federal Government.

A substantial nucleus for environmental services already exists within the Department of Commerce's Environmental Sciences Services Administration (ESSA). ESSA is already conducting most of the services recommended by the Commission in weather and sea-state forecasting, charting, and development of related technology, including space related activities. ESSA, for instance, could implement the Commission's recommendations for establishment of a national environmental monitoring and prediction system.

Similarly, it is not too difficult to envision the Department of the Interior as being responsible for marine resource development. Rather than remove fisheries affairs from Interior as proposed by the Commission, it seems to me at least as appropriate to reconstitute the Department of the Interior so that it would be responsible for natural resources development, adding smaller programs as necessary rather than removing the Bureau of Commercial Fisheries and elements of the Bureau of Sport Fisheries and Wildlife. As the Commission has proposed, the Interior Department would still be left with responsibility for mineral resource recovery in the ocean (Bureau of Mines) and

its responsibilities for aquatic recreation activities (as for instance in the Bureau of Outdoor Recreation and the National Park Service). By the same token, it appears logical to continue and possibly expand the Department of the Interior's responsibilities associated with the coastal zone.

Responsibility for civilian ocean technology might logically be assigned to the Department of the Interior because of its responsibilities in resource development. Certainly, the extensive marine technology from the Navy's programs should be utilized to the fullest extent for civilian purposes.

If you will pardon my natural bias, I should like to refer to the President's Science Advisory Committee's 1966 report, *Effective Use of the Sea*. The PSAC report deliberately centralized responsibility and authority for general purpose ocean research and education in the National Science Foundation. Scientific and engineering research and the education of people to conduct such research is the critically necessary underpinning to both environmental services, resource development, and ocean technology. The Foundation has always been heavily involved in supporting such research. It is for this reason that the Commission's recommendations affecting the National Science Foundation concern me in several ways.

The Foundation is affected in the recommendations respecting the United States Antarctic Program, the National Center for Atmospheric Research, oceanographic facility support to institutions, and the National Sea Grant and College Program. These programs are in direct support of, or closely related to, research conducted in the Nation's universities and colleges. The National Science Foundation is a major supporter of such academic research; indeed, the academic setting is the principal locus of nearly all Foundation support. In contrast, most of the other agencies and bureaus suggested for reorganization in the proposed agency have little or no tradition of, or experience with, support of programs that have as their main purpose the strengthening of academic science resources.

To maintain and to assure the future stability and growth of this Nation's scientific and technological posture, and to be sure that we have the trained manpower necessary in the future to conduct the scientific research to help solve the relevant problems of our society, I strongly believe the Foundation must expand its leadership and increase its support to the academic community in all scientific fields to assure the scientific health of our country. Since all sciences are interdependent, and multidisciplinary efforts are paramount, separating such marine-related programs from other Foundation sponsored activities and isolating them in a new agency would adversely affect this Nation's scientific research and education capabilities.

Moreover, I am deeply concerned with the Report's recommendation regarding the National Sea Grant Program. I must confess that, personally, I had earlier entertained doubts as to the feasibility of such a program as it was originally proposed. However, the Sea Grant Program has made significant and rapid progress. This program has great potential for accelerating the development of the ocean in our national interest. And it has this potential since it has become so highly complementary and catalytic to our long-standing oceanographic research programs. I know you are aware of the Foundation's leadership over the years in building our national oceanographic research program, the large investments we have made in establishing and supporting oceanographic institutions and universities, and the initiation and support of major national and international programs. With the Sea Grant Program becoming such a capping to our marine scientific research and education programs, our potential has been significantly enhanced.

I know you are well aware of the Sea Grant Program's primary objective of marshalling the academic and industrial science capabilities to serve the best interests of the country: (a) through conduct of applied research coordinated in many fields and directed in programs having as their aim the development of marine resources; (b) through direct education and training programs to build the Nation's scientific engineering and technical manpower resources for such exploitation; and (c) through the transfer of scientific and technological information from the developers of such information to the practical users. The Office of Sea Grant Programs has established strong but flexible working arrangements with the Interior Department, ESSA, Agricultural Extension Service, and the Army Engineers. I can assure you that I shall take all feasible steps to enable the Sea Grant Program to reach its full potential in as short a time as possible.

In regard to our responsibility for the health of the Nation's scientific research and the educational activities required to advance our research potential, the Foundation has in the past, and plans in the future, to carry out its responsibilities in this area with all the resources that can be allocated to well-balanced national scientific research programs. The marine programs in the Foundation are substantial and we are making every effort to implement those Commission recommendations that we are not already accomplishing. The Foundation has substantial programs covering the fields of physical, chemical, geological, and biological oceanography, and we have fields of marine-related engineering, including hydrodynamics, sediment processes, materials development, and instrumentation. These programs could be expanded if the national interest required it.

I believe that one of the major reasons for the Commission's recommendations with respect to "University/National Laboratories" was to assure greater stability and flexibility in Federal funding. In this connection, I would point out that the Foundation has, since 1966, provided "block funding" for ships and facilities at major oceanographic institutions.

With respect to the Commission's recommendations concerning coastal zone laboratories, I am pleased to relate that the Foundation's National Sea Grant Program has initiated activities in that form, without being so titled, are in fact coastal zone laboratory-types of operations. The concept of multidisciplinary approaches to the coastal zone problem is inherent in the Sea Grant mission, and the program moved in this direction well before the Commission recommendations were formulated. Some institutions receiving Sea Grant support are already de facto coastal zone laboratories. Some of the Sea Grant multidisciplinary project grants were made for this exact purpose. I might also be noted that the Sea Grant Program is already funding basic engineering studies consistent with the Commission's recommendation for fundamental technology development and is heavily involved in the aquacultural research recommended by the Commission.

With respect to extension services, the Sea Grant Program is entering into agreements with the Departments of Agriculture, Interior, and Commerce, to further expand and improve existing extension services in the marine area.

I firmly believe that the Commission's organizational recommendations must be considered in the context of the total Federal structure for the future, particularly with regard to science, technology, and education. Scientific research and education rank high in our national priorities, and our government must be efficiently and logically organized to serve all areas, not only marine-related areas, for our future well being. Therefore, at least for the short term, I believe that organizing around our strongest existing marine-related areas of strength would quickly serve our national need without disruption of on-going activities. The programs of the lead agencies in the categories I have outlined could be coordinated easily with the Departments of Defense and State.

We recognize the oceans as one of Man's great resources. We recognize our responsibility for developing a better understanding of the oceans; we have pursued this responsibility vigorously in the past; and we are pursuing this responsibility now with well outlined plans for the future. We recognize your responsibility and applaud the action you have taken to render our extension into the sea more effective. I offer you my utmost cooperation, and desire to work with you to assure that our Nation makes effective use of the sea.

This concludes my prepared statement, Mr. Chairman, and I shall be pleased to answer the questions that you and your Committee have.

Mr. LENNON. Doctor, on page 1 of your statement, in the last three lines you say :

Oceanic development can contribute to our economic growth, international cooperation, and our prestige among the nations of the world.

To what degree, doctor, do you think that this oceanic development can contribute to our prestige among the nations of the world, to what degree related to other efforts that we are in now?

Dr. McELROY. I speak to this from a somewhat prejudiced viewpoint. I happen to believe that if we can take the leadership in food resources and food development in the ocean by trying to demonstrate how we can increase the production from the ocean in regard to fish and other edible foods, we can make a contribution to other countries. This increases our prestige.

Mr. LENNON. This fish protein concentrate has not done so well so far, has it?

Dr. McELROY. Unfortunately not. I hope it will start moving now. I am sorry the production has not been great enough.

Mr. LENNON. You let the contract for how many thousands of tons?

Dr. McELROY. I forget the exact figure on that.

Mr. LENNON. We have had a delivery of less than 1 ton. We had to go to the Food and Drug Administration, waiting to give its consent, a little over a year ago now, to the formula.

Thinking in terms of prestige of this program related to other nations of the world, and I am thinking about the \$642 million that was spent to develop the SST, the supersonic transport, and now they are going to spend \$660 million more because of the prestige, do you want to relate those two?

Dr. McELROY. Of course, again I say, that personally I am prejudiced. I wish I had that kind of money for oceanography.

Mr. LENNON. You say in your statement:

I believe that an organization of the scope envisaged by the Commission would become too unwieldy and perhaps provide more problems than it would solve.

How would it be unwieldy, doctor, in your judgment? What problems would it create that it didn't solve, for the record?

Dr. McELROY. Let me make a few statements with regard to what I think oceanography is.

I think many people think of oceanography as a science. Oceanography is a multidisciplinary science. You cannot just be trained in oceanography per se. You have to be a good physicist, a good chemist, a good biologist, or a good geologist to begin with in order to be a good oceanographer.

I think that if you separate oceanography from the rest of the educational process, that is, the process of research training from the rest of the academic community, then oceanography is going to be in isolation, and that would be disastrous for the science of oceanography, in my opinion.

As soon as you combine basic research and education in an agency that is highly oriented toward practical applications, the first thing that falls between the slats, when a budget cut comes, is graduate research, I think that if that happened, such would be disastrous for the future of oceanography.

Those would be two principal reasons against putting them together in one agency. I think experience shows that in the Government this is what happens. When DOD gets a cut, the first thing cut is basic research. When an agency gets cut in authority to do essential things, the first things that are cut are basic research and graduate education, which are the lifeblood of the program we are talking about.

The weather forecasting cannot be stopped. It has to be kept for the farmers and other people in this country. If it is cut, the first thing that goes is basic research. So that is fundamentally the reason I am against putting these together.

Mr. LENNON. Doctor, you state on the last four lines on page 2, and lines 1 to 3 on page 3:

I often have wondered how thoroughly the Navy's vast, long-standing and expert technological efforts in the oceans have been analyzed to determine just how

much they can contribute to our national oceanographic effort. Perhaps such an analysis would reveal information and developments that are useful for civilian purposes.

We had the ICO with the Navy participating and the other agencies. I am talking about the Interagency Committee on Oceanography, and then we had the National Council, and yet no one at any level has insisted that the Navy have an analysis made of the data that has been accumulated by the Navy that could be used for civilian purposes.

Why, doctor? Because you have not had any single agency charged with this sole responsibility to do what you say ought to have been done years ago. Is that a fair statement?

Dr. McELROY. As far as I understand you, it sounds like a fair statement.

Mr. LENNON. Put it in your own words. You are the one who is telling me that you have often wondered why the Navy's vast, longstanding and expert technological efforts in the oceans have not been analyzed to determine how they can be used for civilian purposes.

Why has that not been done?

Dr. McELROY. I cannot answer that.

Mr. LENNON. Who would have the responsibility to do it? Who would have the responsibility to continue the proliferation of this program in 11 agencies?

You raised the questions, but you don't give any answers.

Dr. McELROY. I have not had an opportunity to answer that particular one but I will be glad to try.

I would say if the Navy is directed to do this, it would do it if is given the funds.

Mr. LENNON. Doctor, I am reminded that on the Stratton Commission there was an Assistant Secretary of the Interior. There was an Assistant Secretary of the Navy, and there was Dr. White, the Administrator of ESSA.

I can understand the unwillingness and proper restraint on these gentlemen to join in the Commission's recommendations with respect to a particular Government structure. But since one of those three has left the administration and is a private individual, he has stated emphatically and categorically and definitively that in his judgment this was the way to move.

Now, in addition to that, Dr. White gave us this reply, and I think it was a little embarrassing to the Assistant Secretary of the Department of Commerce who appeared before this committee, who was saying, "Mr. Chairman and gentlemen of the committee, you ought to consider many, many alternatives."

He said: "The Commission's report does not show that they have considered many alternatives."

I said, "Well now, Mr. Secretary, let's turn to the gentleman sitting right at your left, Dr. White, who was a member of the Commission, and ask him if they did go into substantive detail as to what other alternatives there were."

I said, "Dr. White, what is your answer?"

Dr. White said, "Yes, sir. We considered all the alternatives."

Yet the gentleman representing the Department of Commerce inferred that there were no alternatives considered by this Commission, but fortunately Dr. White cleared the record on that.

Don't you believe, Doctor, that this Commission in the 2 years that they gave to the study of this problem, studied the alternatives with respect to Government operation or organization?

Dr. McELROY. I am sure they did, but they arrive at a different position than a previous study did. Their position differs from a previous study on this.

Mr. LENNON. Doctor, what did the administration do to try to implement the results of the previous study that you said was made in what years?

Dr. McELROY. In 1965 and 1966.

Mr. LENNON. What did you do about those recommendations?

Dr. McELROY. Well, as a matter of fact, I would say that the funding had increased tremendously until a couple of years ago, and then the budgets were cut. I would like to mention that we requested, before the House of Representatives, increased funds for our oceanographic programs which were cut in previous years.

As a matter of fact, the NSF budget was cut by almost one hundred million dollars last year, but we maintained the Sea Grant College program at the level we requested even so.

Mr. LENNON. Now you say who cut it?

Dr. McELROY. The House of Representatives first, and then the Congress.

Mr. LENNON. You mean below the authorization figure?

Dr. McELROY. Yes.

Mr. LENNON. And below the budget authorization?

Dr. McELROY. And below the President's budget that was submitted, yes, sir.

Mr. LENNON. What period are you talking about?

Dr. McELROY. This was the NSF budget in its totality that was cut one hundred million dollars. As I say, we asked for \$6 million for sea grant and maintained it as \$6 million.

Mr. LENNON. I noted in your statement your concern about the proposal in the Commission's report to remove from the Department of the Interior and move to the new Government structure the Bureau of Commercial Fisheries and certain elements of the Bureau of Sport Fisheries and Wildlife. You say that in your judgment rather than remove these particular affairs from the Department of the Interior, "... it seems to me at least as appropriate to reconstitute the Department of the Interior so that it would be responsible for natural resources development."

Haven't they had that authority all these many years? Hasn't the Department of the Interior had this authority to move forward in the very direction you stated all these years, and now I ask you to sum that up by saying how effective has the Department of the Interior been when we are now in sixth place in the commercial fisheries in the world and we import, I think, in round figures 70-odd percent of all the edible seafoods that we consume in this country?

How effective have they been? You say they ought to be more effective.

Dr. McELROY. I would say in answer to the first part of the question, sure, they have had the authority, but unfortunately they haven't had the funding to do the job that I think the Commission has asked to be done. It has been a few years since I have looked into the activities of the fisheries.

I have visited many of the Bureau of Commercial Fisheries programs and was very much impressed with what they have done with the money they have had, as a matter of fact.

I think some of their original research on salmon is some of the best that has ever been done in the world. I would hope that one would have an opportunity to look into the science that they have carried out over the years. I do not think they have done a bad job with the resources that they have. Surely, there is always room for improvement, just as there is room for improvement in the programs of the National Science Foundation.

Mr. LENNON. I will have to concede that the Department of the Interior has been stimulated by the report of the Commission, especially in the field of marine sciences, especially by the fact that the Assistant Secretary of the Interior was a member of the Commission, and I am sure as a member of the Commission he was pushing the Department of the Interior to get moving because something was about to happen.

I am afraid that is what motivated them because they have shown an entirely different attitude with respect to the marine sciences in the last 6 months of the Commission's life and especially since the Commission report came out.

Dr. McELROY. Well, I think, Mr. Lennon, it is hearings like this, which I admire very much, that will give strength and direction to these programs. They indicate the interest of Congress, and I think when that is done and we make the commitment, the commitment not only in authority but the commitment in funds, that you will see these places move.

I look again at the amount of money that is going into oceanographic program, and we were in a logarithmic increase phase up to 2 years ago. We were really getting shored up and ready to move.

One of the big problems was that we did not have manpower to man the programs we were talking about, and the universities responded to this, not only in training more people but responding by requesting the National Science Foundation for money to support these people.

Mr. LENNON. Doctor, I get the impression that you are satisfied with the progress at all levels of marine science.

Dr. McELROY. No, sir. I didn't say that. I hope I did not infer it.

Mr. LENNON. I am reminded that back in 1961 and 1962 this committee was considering legislation which was oriented in the general direction of what the Commission has recommended. Each and every department and every bureau that had any facet of the marine science or oceanology or oceanography opposed it, saying, "We are doing a good job, but we think we can do it better than the other agencies." And the administration opposed it, and then finally we decided we would go outside the area or realm of government to try to get some professional advice, and that is the reason we came up with the legislation which established the Commission and mandated it to make the study and report to the President and to Congress.

We sought to try to get a high level of coordinating policy when we moved in the direction of the National Council. Of course, you know who fought that, the administration. They opposed that. They said, "We have an ICO. We don't need it."

We said, "We think we ought to have it." Six months after we established it, they organized under the leadership of Vice President

Humphrey and it became a viable organization and made a great contribution.

But if we followed the recommendation of the powers that be in the power structure, as you call it, at the Washington level, the executive branch of the Government, we wouldn't have had it. We wouldn't have had anything. They wanted the status quo.

Dr. McELROY. I think it is interesting that it was about that time that I was on PSAC, and I modestly say that I was instrumental in trying to get this study underway. I have a copy of that study here today. If you want to see the report I will send it to you.

It does not disagree with the Commission in regard to the science and what we need to be doing in science.

Mr. LENNON. Now, you say on page 10, the last paragraph:

I firmly believe that the Commission's organizational recommendations must be considered in the context of the total Federal structure for the future, particularly with regard to science, technology, and education.

Who do you suggest ought to consider this other than this committee? Are you talking about the Ash Commission?

Dr. McELROY. No, I am talking about this committee. I think it is very important for this committee to consider this.

Mr. LENNON. Do you know anything about the Ash Commission?

Dr. McELROY. I only know it by name. I have had no contact with it.

Mr. LENNON. We know that the President mandated the Ash Commission on, I think it was, May 19 to make a specific study of the Commission's report particularly as it was related to government structure, and we have in the file a photostatic copy of the memorandum from the President to the Ash Commission, so that we assumed that by approximately mid-September that the Ash Commission would have at least given some thought to the matter.

So we called them on September 10 and they said, no, they hadn't even organized yet, and on September 11 they advised us that:

We hope to launch a study within the next month or two. After we get into the problem, we will be in a better position to estimate how much longer it may take to consider the study.

Dr. McELROY. I will say, Mr. Lennon, what I have said earlier, that I think that the science, from the studies going back 15 years ago at the National Academy of Sciences, followed on by the PSAC study, followed on by the Commission's report, is clearly identified, and I think we are ready to move and, even more, move more vigorously in support of the scientific component of the marine environment.

Mr. LENNON. Doctor, what is your judgment and evaluation of the members of the Stratton Commission?

Dr. McELROY. Evaluation of what? I am sorry.

Mr. LENNON. What is your judgment and evaluation of the individuals who compose the Stratton Commission, starting with Dr. Stratton?

Dr. McELROY. The people I know I think very highly of.

Mr. LENNON. How many did you know?

Dr. McELROY. I know Dr. Stratton. I think very highly of him. I know Dr. Geyer from Texas A. & M., an outstanding person. I know Mr. Blaustein, he lives in Baltimore where I formerly lived. Dr. Crutchfield, an economist, I know and think very highly of. John

Knauss I know as a friend and, particularly, since I was consultant to his committee on the Stratton report, I worked closely with him on the basic science part of it.

Mr. LENNON. Could you get him to write in your individual views?

Dr. McELORY. We were dealing only with the basic science and education. We were not involved in the organizational structure.

Mr. LENNON. He was a member of the Commission?

Dr. McELORY. Yes.

Mr. LENNON. Who ultimately had to make a decision?

Dr. McELORY. I didn't talk with him about that, no.

Mr. LENNON. I see.

Dr. McELORY. I know Dr. White, of course. I think very highly of him. Of course, I have just met Mr. Lennon, and I think he is very perceptive in asking questions on this program. I know Senator Magnuson, whom I knew a long time ago because of our interest in oceanography, and I have recently met Mr. Mosher, whom I regard very highly.

Mr. LENNON. The congressional members took no part, as you know, in anything except trying to relate to the commission congressional intent with respect to what we hoped to accomplish.

Now, the gentleman from Ohio, Mr. Mosher.

Mr. MOSHER. Thank you, Mr. Chairman.

Dr. McElroy, this committee has heard conflicting testimony and has had conflicting advice concerning this matter of the wisdom and the practicality of putting responsibility for day-to-day action in the operations in Government, mission-oriented, putting that type of activity together with responsibility for research and development in one agency or under one administrative head.

You have raised that question in your testimony.

Now, we have had two or three witnesses that have rather urgently encouraged us to do that, to put research and operations in the same agency, based on their practical experience. They tell us that science, research, and particularly applied research and the action programs nurture each other and that there is good reason to have them administered together and functioning together.

On the other hand we have had at least one important witness arguing that it doesn't work, and I think he specifically referred to ESSA as an example where the administration was so science-oriented that the action programs suffered, were neglected.

Now, you have given us an opposite point of view today. You have said that where these are put together in one department at least so far as funding is concerned, and I think that is where you put the emphasis, inevitably the research and the science suffers and the action programs are sustained.

So we have conflicting points of view here.

Dr. McELROY. Mr. Mosher, I would say that one could look at the history for the last 15 years in this country and look at mission-oriented agencies and what happens when their funds get cut.

I happen to have been on the other end and know this very clearly.

Mr. MOSHER. Could you cite an additional example?

Dr. McELROY. Let's take the Navy. When the Navy's funds are cut, the first thing that gets cut is the Office of Naval Research, and in turn the support of investigators in graduate education research will get cut.

I think you will have a witness who follows me who was formerly with the Navy who can validate this statement. That is the reason I picked this out of the hat as an example.

Mr. MOSHER. Of course we are talking about civilian agencies. There might be some compulsions in the military field in the defense area that would make this more true there than in some other cases.

Dr. McELROY. Let's take AEC. That is another example. They are on a ceiling now and they have a responsibility to do certain things that they cannot cut. When their overall budget gets cut, the first thing that has to go is basic research.

I think you will also find that this is true in weather forecasting, as I said. It almost would be inconceivable to think that you could cut out weather forecasting in this country in order to support basic research for a year or two until you recover.

I think the same thing would happen there, as an example. I think it is a bad mix anyway. I think the argument of putting basic research and graduate training into what I call civilian technology, let's say, has never been a happy mix.

There has always been good interaction between responsible agencies as far as I am aware, and I think Mr. Abel can give you some good examples of what is going on in the sea grant program right now. There has always been good interaction, and this is true even in industry. Even in the best industries where they have a basic science component and a production component, when things get tight, the first thing that is cut is the basic science component because their immediate livelihood depends on marketing and getting the product out. Even in your best industries you will find that this is true.

Mr. MOSHER. We certainly would all want to emphasize that the interaction is extremely important?

Dr. McELROY. This I agree with one hundred percent.

Mr. MOSHER. We want to achieve the most effective arrangements for encouraging that interaction?

Dr. McELROY. That I have no objections to. If we can find arrangements to improve that interaction, which I submit is improving tremendously in a lot of areas, then I am all for them.

Mr. MOSHER. Well, we do have really very conflicting testimony before this committee on that subject.

Dr. McELROY. I know you do.

Mr. MOSHER. As the chairman has emphasized, it is important that we consider all the alternatives.

Dr. McELROY. Yes.

Mr. MOSHER. On page 2 of your prepared testimony you say:

I recognize, of course, the breadth and depth of the Commission's deliberations. However, I am not persuaded that all aspects of marine science can be welded into one agency without some of its components drastically suffering.

I am sure you recognize that the proposed NOAA does not by any means include all aspects.

Dr. McELROY. Yes.

Mr. MOSHER. The Commission considered and rejected, and I believe that this committee has considered and implicitly at least has rejected, the idea of a so-called wet NASA, a really all-over concentration of activities of the oceans such as we have in activities in space concentrated in NASA.

We all recognize that that can't be done, for a variety of reasons. So I do want to emphasize that in our consideration of NOAA we certainly are not considering that all aspects of the marine sciences would be welded into one unit.

Dr. McELROY. I submit that that is correct. Yes, sir.

Mr. MOSHER. Now, in the Commission report one of the things emphasized most frequently was the lack presently, the lack of any center of support and responsibility for the development of civilian technology in the oceans.

This is a serious lack at the present. There is no one Government agency that is given the job of developing the basic technology that is so needed.

I judge from your testimony that, since you are not in favor of NOAA, where the Commission would put it, you would put that responsibility in the Interior Department. Is that what you are saying?

Dr. McELROY. Yes, sir.

I might add, Mr. Mosher, and if you would like to ask Mr. Abel in detail about this, you may, that although it is a modest program, I think we are moving significantly along that line in the sea grant college program where we are trying to get industry and the university people concerned with marine technology together. We have made some very interesting starts along this line, and I think Interior in effect could take off from there and move ahead. I think at the same time they would be wise if they made use of certain aspects of the Navy's great technology capability in the ocean.

Admittedly there has been some coordination in this area in making use of that capability.

I think if Interior were directed and given the funds to do this, I have confidence that they could do it. I do not believe they have been given that directive yet.

Mr. MOSHER. I think private industry, itself, has taken a lot of very interesting, commendable initiatives in the development of basic technology, but obviously the capital costs involved, the investments involved in some technology that is needed are not going to be risked by private industry. The Government is going to have to do the job.

Now, turning to your assistant there, Bob, I certainly didn't understand that you were given a mission nor the sea grant program was given the mission to do that job. It must be in a very miniscule and primitive way that you are moving in that direction because you certainly don't have the funds.

I don't think you were given that responsibility or that mission. I don't think you have the authority or the responsibility that was contemplated in the Commission's report, and that we consider important, to enter into contracts with private laboratories and with Government laboratories or with private industry, to enter into contracts for the development of hardware and that sort of thing.

You aren't in that business at all, are you?

Dr. ABEL. According to the act, Mr. Mosher, we are theoretically permitted to work with public and private organizations. In actuality, of course, there are certain problems attendant upon such arrangements, and the National Science Foundation has refined the role of the sea grant program toward implementation of applied research working primarily with the universities and colleges. This is, after all,

the national sea grant college program. We encourage the development of consortia between industries and universities and colleges for the purpose of making the most effective use of the talents, competencies, and facilities of both.

The industrial input to the program is normally through the university, who is our direct grantee.

With respect to your question about the intrusion of the sea grant program into development, I would rather emphasize our responsibility for applied research, and we are encouraging applied research in fields such as agriculture, aquatic reaction, marine pharmacology, or drugs from the sea and programs relating to location and development of mineral resources.

We do not, however, deal with heavy civilian technology in perhaps the sense that is implied in the Commission's report; that is, dealing with heavy engineering.

Mr. MOSHER. Mr. Chairman, I wish the gentleman from Florida, Mr. Rogers, was here to refresh our memory a little bit about the history of the creation of the sea grant program, but I think it is good to have it in the record at this point.

As I remember it, the Members of Congress most interested in establishing the sea grant program were anxious from the start that it be part of an agency in which there was coordination of ocean activities.

There was a great deal of discussion with the Bureau of the Budget and among ourselves, although I wasn't one of the prime movers here, but among the members of the committee, a great deal of discussion with the Bureau of the Budget as to where it belonged, even in advance of creating any organization like NOAA, which, of course, many members of this committee favored as long ago as 1964 or 1965.

Even in advance of that there was a desire to get the sea grant program going and so the question was where to put it tentatively at least or temporarily, and on the advice of the Bureau of the Budget and with, I think, the unanimous agreement of all of us, it finally was placed in the National Science Foundation, at least temporarily and tentatively. There was always that temporary and tentative emphasis.

It was placed there because we all recognized and acknowledged that the National Science Foundation had developed a very effective system for recognizing excellence and defining the certain scientific needs and selecting the people who should receive grants and the universities that should receive grants.

We all recognized that the National Science Foundation has an excellent procedure for this, and so that is really why the sea-grant college program landed in the National Science Foundation.

But just for the record, historically, it should be recognized that Congress always thought of this as a tentative and temporary assignment.

Dr. McELROY. Yes, sir. I think that is a correct statement, Mr. Mosher. I was in on that discussion.

Mr. MOSHER. Mr. Chairman, that is all I have.

Mr. LENNON. Thank you, Mr. Mosher.

Mr. LENNON. Doctor, I have here in my hand the report of the panel, of which you were a member, headed by Dr. Donald Hornig, which was submitted to the White House, I assume, since it is so dated, June

17, 1966, submitted for the acceptance of it by President Johnson. You were a member of the panel.

I am going to ask unanimous consent to have inserted in the record at this point that part of the report that begins on page 87, designated as "Organization for the Future," and to be concluded on page 91, lines 1 and 2.

(The pages mentioned above follow herewith:)

[From the Report of the Panel on Oceanography, entitled "Effective Use of the Sea," dated June 1966, for sale by the Superintendent of Documents, U.S. Government Printing Office.]

* * * * *

10.4 ORGANIZATION FOR THE FUTURE

If one examines present agency activities against the four governmental functions defined in section 10.2 quite clearly the Government is doing very well in meeting its responsibilities in supporting programs of research and education. NSF and ONR have developed strong support for academic activities in oceanography, although these need to be broadened beyond oceanographic institutions (see secs. 4.11, 5.4, 9). On the whole the Panel believes that both NSF and ONR have discharged their duties well. Beyond the provision of ships, laboratories, and the National Oceanographic Data Center, the Federal Government has done little to provide technical services and facilities. We see an increased need for such facilities, and we expect the Navy to play a much more important role in the future than it has in the past.

Some progress in describing the environment has been made, but our abilities to predict are still minimal (see sec. 6). Responsibilities for description and prediction are scattered throughout the agencies. The Navy supports a large survey program, as does ESSA, while smaller survey programs are found within Bureau of Commercial Fisheries, Geological Survey, and Coast Guard. The Navy, Coast Guard, and ESSA are all involved in the prediction problem, but the techniques remain primitive and do not reflect substantial advances in theoretical oceanography.

Fostering development of biological resources of the ocean is the responsibility of BCF, while the Bureau of Mines, and Geological Survey have statutory responsibilities regarding mineral resources.

No single agency has prime responsibility for developing and advocating national policy, although each agency on occasion develops programs of oceanography which further the particular agency's mission.

We could recommend continuation of the present organizational framework with words of caution regarding the importance of coordinated efforts. We do not believe this to be the wise course. For example one of our major recommendations is to develop the technology for improved use of marine food resources. Such activity naturally falls into the domain of BCF. A cursory examination of the required program, however, reveals that it would depend very heavily on physical oceanography. For example, thorough studies of upwelling and turbulent fluxes are required for proper implementation of certain phases of the program. Prediction of the environment is important. Would this mean that BCF should develop its own capabilities in physical oceanography, turn to ESSA or engage the Navy?

ESSA is primarily charged with development of prediction techniques for furtherance of commerce. Its rightful emphasis is on prediction of storms and research undertaken within the agency has little to do with problems of improving marine food technology. BCF could seek help from universities or industrial concerns, but again this would duplicate efforts of other environmental agencies. This brief example illustrates some of the problems the Panel foresees in implementation of its major recommendations within the present administrative structure.

The Panel *recommends* a major reorganization of non-Navy governmental activities in oceanography. The recommended reorganization would place in a single agency all those Federal activities related to *description, prediction, and attempts* to develop capabilities of modifying the environment (ocean, atmosphere, and solid earth) and those activities concerned with managing and developing resources of the ocean. The proposed reorganization emphasizes the

unity of environmental science and observational technology.² This unity is one of the themes of this report and has been discussed at length in sections 2, 3, 4, 6, and 9. For example, progress in description and prediction of the ocean environment. Exploration of mineral resources on the Continental Shelf requires the *coupled system*, each affecting the other in important ways.

The second basic motivation for reorganization is the fact that the ability to work within the oceans, to develop the oceans' resources and to use the oceans depends very heavily on our proficiency in describing and predicting the environment. Exploration of mineral resources on the Continental Shelf requires the ability to work not only along the sea bottom, but in the water column above as well. Prediction of sea-bottom conditions and conditions in the water column will be as important in the next 20 years as the prediction of weather and wave heights at the surface.

In summary the reasons for the proposed reorganization are:

1. Unity of environmental sciences and observational technology.
2. Dependence of oceanic development for industry and commerce on our ability to predict the environment.
3. Clearly establishing responsibilities for executing national objectives and nondefense missions for the oceans.

In broad outline the reorganization would combine activities of the Environmental Science Services Administration, the Geological Survey (both its land and ocean activities), oceanographic activities of the Bureaus of Commercial Fisheries and Mines, and a portion of the Coast Guard's oceanographic activities. Such grouping would provide an agency competent to deal with the four functions of government listed in section 1. The Panel does not make any recommendations as to whether the new agency should be independent or part of an existing agency.

With the creation of a new agency oceanographic activities of the Nation would be supported in five ways:

1. By the NSF in its traditional role in support of fundamental studies through grants and fellowships with special emphasis on aspects that contribute to manpower education for ocean science and technology.
2. By the new agency in carrying out its responsibility for management of the environment and ocean resources and for providing description and prediction services through a balanced program of direct participation and support of industry and universities.
3. By the Navy in carrying out its mission of national security through its laboratories and industry and through ONR support of civilian institutions, as well as by its supporting role in the development of undersea technology and provision of national test facilities.
4. By agencies such as AEC and HEW in carrying out their missions.
5. By the Smithsonian Institution in fulfilling its unique obligation to systematic biology.

In summary the proposed new agency would be an operating agency whose mission is to provide for effective use of the sea by man for all purposes to which we now put the terrestrial environment. The agency's responsibilities would be broader than just the quest of new knowledge and understanding. In addition, in the provision of prediction and description services the agency would be responsible for the atmospheric and solid-earth environment.

The creation of a mission-oriented agency with major responsibilities for ocean development of science and technology does not by itself provide a clear mechanism for coordination, planning, and budgeting. Several agencies, the Navy and NSF in particular, will continue to have major responsibilities in ocean-oriented activities. The need for information interchange and dissemination now discharged by ICO will continue and we *recommend* formation of an interagency group under the Federal Council for Science and Technology to provide services now rendered by ICO and the interagency Committee on Atmospheric Sciences. This group should also have responsibilities for information interchange involving the solid-earth sciences. This group would thus link the activities within the new agency with those in other agencies for all the environment sciences.

Budget allocations between the new agency, NSF and the Navy would be on a competitive basis, recognizing the mission responsibilities of the new agency and the Navy. The Federal Council, the Bureau of the Budget, and Congress would all participate in the budgeting process. Though the proposed agency does

² See app. V for a note on the testimony of J. W. Powell who recognized the same unity and recommended roughly the same reorganization to Congress in 1884.

not solve all problems of budgeting, it does provide a centralized authority with major mission responsibility for the oceans.

The proposed reorganization will create a multitude of political and social problems. However, at present a unique opportunity exists to develop an organization capable of assuming major responsibility for the national goal of the effective use of the sea by man. Achieving this capability will be worth the problems.

Mr. LENNON. I think it might be interesting to quote from a little of it, even though we will put the whole thing in the record. The panel of which you were a member recommends:

* * * a major reorganization of non-Navy governmental activities in oceanography. The recommended reorganization would place in a single agency all those Federal activities related to decryption, prediction, and attempts to develop capabilities of modifying the environment (ocean, atmosphere, and solid earth) and those activities concerned with managing and developing resources of the ocean.

I shall not attempt to read all that we are going to put into the record.

In other words, as you say:

In broad outline the reorganization would combine activities of the Environmental Science Services Administration the Geological Survey (both its land and ocean activities), oceanographic activities of the Bureaus of Commercial Fisheries and Mines, and a portion of the Coast Guard's oceanographic activities. * * * The Panel does not make any recommendations as to whether the new agency should be independent or part of an existing agency.

But in the very next line you say, however:

With the creation of a new agency oceanographic activities of the Nation would be supported in five ways—

And then you enumerate them. Then you say:

In summary the proposed new agency would be an operating agency whose mission is to provide for effective use of the sea by man for all purposes to which we now put the terrestrial environment. The agency's responsibilities would be broader than just the quest of new knowledge and understanding.

Now, actually, Doctor, this organization, this new Government structure that you recommended back in 1966 as a panel member, how does it basically differ from the Government structure recommended by the Stratton Commission, so far as its bringing into this composite organization the fragmentation of the agencies that are now existing? How does it differ?

You bring in the Environmental Science Services Administration, which the Stratton Commission recommends. You bring in part of the Bureau of Commercial Fisheries, which they bring in. You bring in part of the Coast Guard, which they bring in. You bring in part of the Geological Survey, which they bring in.

How does your recommendation in 1966 basically differ from the recommendation of the Stratton Commission?

If anybody reads this, I think any fair, reasonable-minded person reading it would get the impression that what the Commission of which you were a panel member recommended is basically, in substance, what the Stratton Commission recommended.

Dr. McELROY. What we did not say at the time, as you correctly read, is that we did not identify an agency to accomplish these functions.

I said earlier that I thought Interior, Commerce, and the Foundation could logically serve as Federal areas of strength in their responsible categories of marine science.

I seem to remember that in 1965 ESSA was just getting underway, and since then I think ESSA has demonstrated a capability which at this time I would say I would not disturb by removing it from Commerce.

MR. LENNON. You say, "The Panel does not make any recommendation as to whether the new agency should be independent or part of an existing agency," then in the very next line, "With the creation of a new agency . . ." And then you go on and talk about the advantages of a new agency.

You say you make no recommendation, but you point out the advantages of a new agency.

DR. McELROY. I think the new agency in our mind was a renaming and redefining of the responsibilities of Interior at that time.

Also, you must admit that in the Commission's report the National Science Foundation's role in this program is greatly affected, and the PSAC Panel did not recommend that it be disturbed. The Commission report removes from the Foundation the Antarctic program; NCAR; institutional support for our big oceanographic institutions, that is well established and ongoing; and the national sea grant program, that is flourishing and that is moving ahead.

MR. LENNON. I gather from your statement that what you are recommending is that the agencies that are recommended to go into the new NOAA Government structure now be put into the Department of the Interior, with a separate agency or bureau within the Department of the Interior.

DR. McELROY. I say in the Department of the Interior, except now I will back off and not say what we said earlier with regard to ESSA. I think ESSA has a unique responsibility of its own.

MR. LENNON. Did it have the unique responsibility when you signed this report?

DR. McELROY. ESSA was only about a year and a half or 2 years old at that time, sir.

MR. MOSHER. May I interrupt?

MR. LENNON. Yes, sir. We will get a dialogue here which will get what we all are trying to seek to do.

DR. McELROY. I understand.

MR. MOSHER. I am interested in the 1966 recommendation. I read it at that time, but I had forgotten it in this detail.

Do I sense that even then you figured, and this report figured, a separation of the research and development function—

DR. McELROY. Yes, sir.

MR. MOSHER (continuing). From the other operational functions? Is that your memory of the 1966 recommendations?

DR. McELROY. Yes, sir. That is correct.

MR. MOSHER. And that is the emphasis, the basic emphasis so far as organization is concerned in your testimony today?

DR. McELROY. That is correct.

MR. MOSHER. That there should be a separation of the science and research functions and that they should remain in the National Science Foundation?

Dr. McELROY. That is correct. That was before I was associated with the National Science Foundation.

Mr. MOSHER. On page 90 of the 1966 report, where it says: "In summary the proposed new agency would be an operating agency," that is what you would emphasize. Is that right?

Dr. McELROY. Yes, sir.

Mr. LENNON. Thank you, Doctor.

I am compelled to ask just a closing question.

Suppose that was true in our space program. Suppose you had over here in two or three agencies of the Federal Government: the scientific development, and over in another agency of the space program we had operations or practical appliances of science in administrative capability. Do you think we would have a man on the moon before the next two or three centuries?

I don't think so.

Dr. McELROY. I don't either, but that was one specific mission. If you say to the Navy, "Here is \$3 billion. I want to put a man at 20,000 feet below the surface of the ocean in 10 years in order to walk around and look at it," I would be willing to bet my hat that the Navy would do it.

Mr. LENNON. Speaking of that, I was reminded this morning that down in Mississippi they have a complex in relation to the space agency, costing I think around \$300 million. I am told it is being utilized now by NASA only 20-30% of its capability.

This is not off the top of my head. I will not repeat the gentleman's name who gave me that information, but he is in NASA, and he called it to my attention.

They want their part of the action. He was calling my attention to some of these other complexes we have around the Nation related to the space program that are not being utilized except to a very small percent. They have the capability, and he said, "Why not use us? We want to follow this action. We think this is the next step."

Dr. McELROY. At a time when we have to cut our ship operations by 20 percent—

Mr. LENNON. That is the way organizations work in Government. Those that get the national image get the money, get the funding.

The gentleman from North Carolina.

Mr. JONES. No questions.

Mr. LENNON. Counsel, do you have questions?

Mr. CLINGAN. Doctor, on page 3 of your statement you talk about weather, and I quote:

The scientific research and resulting technology in weather prediction and monitoring must be continued on a high priority, perhaps more for our activities on land than at sea.

Are you taking issue with the Commission's position that the sea and the atmosphere should be considered as an environmental envelope?

Dr. McELROY. No, not by any means. I am saying that they emphasize that an agency that is more land oriented tends not to look at the sea.

I would argue that an agency that is sea oriented would not tend to look at the land, and I submit that weather prediction, rain and so

forth, at the present time, is one of the most important environmental activities for a land operation.

Mr. CLINGAN. Are we getting adequate data, do you believe from the sea to support weather prediction for the land?

Dr. McELROY. No, sir. No, sir.

Mr. CLINGAN. How could we improve that?

Dr. McELROY. I think the big buoy system that has been proposed earlier, even back in 1966, would be one step forward towards getting that information, and it is true that at NCAR they are getting to a point where they think they are going to be able to write out a formula, in effect, that would give long-range prediction. I think they need additional data, though, from all over the world, over the water as well as the land.

You cannot separate these in the sense of the weather in its broadest sense. After all, it is an interaction with the energy from the sun from an altitude of 80 kilometers right down to the oceans, and over the land, so that you need information from all over.

What I am saying is that I would use the Commission's argument that, if you get a sea-oriented agency, that would tend to forget about weather prediction on the land, where it is most important for the farmers right now, and other people, of course, including aviation, the cities and so forth.

Mr. CLINGAN. You mentioned the data buoy program. Is that not a national program project in the Commission's report? Did they give major emphasis to that?

Dr. McELROY. Yes, they did. That is right.

Mr. CLINGAN. How much has the Coast Guard appropriated over the past 2 years for the National Data Buoy program?

Dr. McELROY. I don't have any idea.

Mr. CLINGAN. Do you know whether it is considerable, or small?

Dr. McELROY. I don't have that information. We can look it up for you.

Mr. LENNON. What was the funding in fiscal 1968 for the National Science Foundation? I mean the actual appropriation.

Dr. McELROY. \$495 million plus the \$10 million for the Sea Grant program; \$505 million.

Mr. LENNON. Would you repeat that?

Dr. McELROY. Could I ask Dr. Todd to answer this question?

Mr. LENNON. I would appreciate it, Dr. Todd.

What was the actual funding for fiscal 1968, not related to the Sea Grant program, and then the figure for the Sea Grant program?

Dr. TODD. The actual appropriation for the National Science Foundation in 1968 was \$495 million, as compared to the Presidential budget request of \$526 million.

I may have to correct these by 1 or 2 percent, because I don't have a recollection of all the little carryovers.

Mr. LENNON. The Sea Grant part of that figure that you gave for fiscal 1968 was what?

Dr. TODD. The Sea Grant part of the figure in the Presidential budget request was \$4 million, and a sum of \$4 million was provided out of the appropriation for Sea Grant, with no reduction. Furthermore, a sum of \$1 million was carried over from fiscal year 1967.

Mr. LENNON. That was an infinitesimal part of your overall appropriation.

Dr. TODD. It was a brandnew program.

Dr. McELROY. It was a brandnew program then. We are budgeting more as the program moves ahead.

Mr. LENNON. I think you did well to move cautiously.

Do you have the figures, Doctor, for the fiscal year 1969?

Dr. TODD. For fiscal 1969, the Presidential budget request for the Foundation was \$500 million, which included \$6 million for the Sea Grant program.

Mr. LENNON. And the appropriation?

Dr. TODD. The appropriation was \$400 million, and to that was added \$261½ million of reserve funds released by the Bureau of the Budget.

We provided for the Sea Grant program that year the same amount we requested in the Presidential budget; a figure of \$6 million.

Mr. LENNON. The fiscal 1970 budget?

Dr. TODD. The request for the Foundation was again \$500 million, and this included \$10 million requested for the Sea Grant program.

The appropriations process is, of course, not yet complete.

Mr. LENNON. I believe the House has passed the appropriation bill, has it not?

Dr. McELROY. \$420 million.

Mr. LENNON. \$420 million. That was subject both in fiscal 1969 and 1970 to the agreement worked out between the Bureau of the Budget and the Office of the President and the Congress with respect to a level of funding. That is reflected in that reduction in the budget level, and what was ultimately appropriated, the arbitrary ceiling that was imposed.

Dr. McELROY. But I point out that we kept the Sea Grant program where we originally budgeted it, and we are emphasizing it as a high priority program.

Mr. MOSHER. Mr. Chairman, I cannot resist expressing my own concern and alarm at the action of the House in appropriating for fiscal 1970 for the National Science Foundation at a level that is, as I remember, around \$70 million less than the Science and Astronautics Committee's recommended authorization figure.

Also I cannot resist expressing my concern, or I don't know what the right word is, over the fact that we have already appropriated in the House when we have not even voted on the authorization bill. It is a very peculiar situation.

From the testimony we have just heard, I judge that for the last 2 years the National Science Foundation has actually allocated to the Sea Grant program more money than was really proposed in the actual appropriation bills, in other words, has maintained the National Sea Grant program at a level of their requested authorization, even when Congress appropriated less.

You have had to transfer funds from other programs?

Dr. McELROY. That is right.

Mr. MOSHER. This does show your emphasis on the National Sea Grant program as a high priority, and I must say that I think this committee is pleased by that.

Dr. McELROY. Mr. Lennon, I want to make sure I understood. Did you say that the President agreed to the reduction in the funds?

MR. LENNON. I am speaking about the ceiling that was put on.

DR. McELROY. The expenditure ceiling?

MR. LENNON. The expenditure ceiling, the resolution.

DR. McELROY. I am sorry. I thought you meant the actual amount appropriated.

MR. LENNON. That was a joint action on the part of the President and the Congress.

DR. McELROY. Yes, I understand that.

MR. LENNON. Gentlemen, we appreciate your attendance here this morning.

I think it has been very confrontative, which I guess is as good a word as anything else. We have hammered out some views here.

I say to you, as I said to the other gentlemen, this is not an easy thing to do. It was the consensus of Congress that we should have the Commission make this study, and we have a responsibility of hearing it in depth to determine the consensus here.

What we will do, I don't know.

MR. MOSIER. Mr. Chairman, I am going to be on a college campus this weekend, and maybe I will have a chance to use that new word you just coined, "confrontative."

DR. McELROY. I can say, Mr. Lennon, I appreciate very much having the opportunity to appear for the first time as a greenhorn, so to speak, in the National Science Foundation, and I can assure you that we are going to do everything possible that we can to move our responsibilities forward with regard to the oceans. We are excited about it. We think we have good people, and we think we know how to get the job done.

MR. LENNON. Thank you.

It has been our pleasure to work with the distinguished gentleman to your right, Dr. Abel, who has appeared before the committee a number of times.

We appreciate the fine job that all of you are doing. We appreciate it.

Thank you, gentlemen.

DR. McELROY. Thank you.

MR. LENNON. Dr. Galler, do you have someone with you, sir? Perhaps if they come forward with you, we can hear your statement.

It is our understanding that you will, Dr. Galler, present the statement of the Secretary of the Smithsonian Institution. Is it your intent to read it in its entirety, or to summarize it, or what is your pleasure?

STATEMENT OF DR. SIDNEY R. GALLER, ASSISTANT SECRETARY, SCIENCE, SMITHSONIAN INSTITUTION; ACCOMPANIED BY DR. I. EUGENE WALLEN, DIRECTOR, OFFICE OF OCEANOGRAPHY AND LIMNOLOGY; AND H. CRANE MILLER, ASSISTANT GENERAL COUNSEL, SMITHSONIAN INSTITUTION

DR. GALLER. To summarize it, Mr. Chairman, in the interests of conserving time, and with your permission, I would like my associates, Dr. Wallen, the Director of the Office of Oceanography and Limnology of the Smithsonian Institution, and Mr. Crane Miller, the assistant general counsel of the Smithsonian Institution, here with me.

Mr. LENNON. It is always good to have a lawyer with you.

I welcome you gentlemen. I am delighted to have you.

You may proceed, Doctor.

Dr. GALLER. First, Mr. Chairman and gentlemen of this committee, the Secretary of the Smithsonian Institution wishes to express his deep appreciation at the opportunity to deliver a statement before the committee, and his sincere regret that he was unable to appear in person, and asked me to deliver his statement for him.

With your permission, I would like to summarize it.

STATEMENT OF S. DILLON RIPLEY, SECRETARY, SMITHSONIAN INSTITUTION, AS PRESENTED BY DR. SIDNEY R. GALLER, ASSISTANT SECRETARY, SMITHSONIAN INSTITUTION

Dr. GALLER. This is a statement of Dr. S. Dillon Ripley, the Secretary of the Smithsonian Institution, presented to the Subcommittee on Oceanography of the House Committee on Merchant Marine and Fisheries, October 1, 1969, on bill H.R. 13247.

Mr. Chairman, members of the Subcommittee on Oceanography, my name is S. Dillon Ripley, Secretary of the Smithsonian Institution. I am very pleased to have the opportunity to comment on the proposed bill and to propose ways in which the Smithsonian Institution could contribute to its purposes.

First, I wish to commend the Committee on Merchant Marine and Fisheries and this subcommittee in particular for their many years of guidance in the field of oceanography leading to the evolution of a truly national program of ocean science and technology.

This subcommittee has identified the advantages of accelerating the development of a wide-ranging program coordinating all aspects of the national interests represented by the governmental agencies as well as the broader interests of academic science, industry, and the public at large.

In addition, I would like to commend the Commission on Marine Science, Engineering and Resources on the excellence of its report that has served as the basis for H.R. 13247.

I have watched closely the activities and deliberations of the Commission and have valued very highly my association with Dr. Stratton and the members of the Commission. I consider them to be highly competent, dedicated individuals who have approached this report with careful study and devotion to duty.

I hope the Subcommittee on Oceanography will continue its excellent efforts to enhance the national program, recognizing as did the Vice President when he mentioned in his February 24, 1969, speech in New York, that:

"We intend to use the science of oceanology to serve the pressing needs of society. The knowledge of the seas must be used to serve the cause of world peace."

The bill, H.R. 13247, is put forth to amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research development, technical services, exploration, and utilization with respect to our marine and atmospheric environment.

I believe in the importance of such a program, and in the importance of making the program most effective by insuring the close coordination of our Nation's activities in ocean science and technology.

I understand that the President has asked his Advisory Council on Executive Organization to consider the Commission's organizational recommendations in the context of broader Federal organizational requirements, and to compare the Commission's proposals with alternative ways of coordinating and advancing the national development of the marine sciences.

I would like to point out that we should recognize the inseparability of our planetary environment, which includes not only the sea, but the land and the atmosphere above both. All three contribute directly to the quality of the oceanic environment, and an improved understanding of their separate and collective contributions may lead us closer to the solutions to problems of environmental degradation and marine resource utilization.

I suggest, therefore, that in developing operational guidelines for the development of national goals, the Federal agencies consider not only the shorelines which are directly involved, but also the contributions of the interior land to the marine environment.

A number of witnesses who have testified before this subcommittee have emphasized the need for more work in basic science. As the representative of an agency whose mission is basic science rather than tangible resources, I want to emphasize the basic science implications of this bill in the context of the Commission report.

The Commission report states:

A full realization of the potential of the sea is presently limited by lack of scientific knowledge and the requisite marine technology and engineering.

Also:

Support of basic marine research is vital if we are to understand the global oceans, to predict the behavior of the marine environment, to exploit the sea's resources, and to assure the national security.

I believe that increased funding for basic research is essential to achieve the national goals for studies of the oceans. These goals have been described, but I might simplify the descriptions.

We require more food from the sea. We must maintain full access to the oceans for transportation of goods. The harvest of oil, gas, and mineral resources from the shallow seabed is essential for our civilization to advance. Continuing exploration will certainly identify additional resources of great value to us. It appears possible to achieve some control of oceanic forces to influence weather. Pollution of the sea, however, must be controlled.

While we have learned a good deal about food production and the husbanding of cattle and other food animals from the land, our management of sea life is in a very elemental state. The commercial fisheries are based almost entirely on habit and accident.

Our "number one crop" from the sea is the wide-ranging ocean tuna. We have no way of knowing how close we are to depleting this population. We also know very little about what substitute fishes might be used for building auxiliary fisheries.

Many so-called trash fish are quite edible and nutritious. If we are to expand these probably available and probably useful sources of

food, we need to know a great deal more about their biology, geographic and seasonal distribution, as well as their ecological inter-relationships with other species and the environment.

Experimental breeding over the last 100 years, helped by the land grant college system, has produced fine herds of dairy and beef cattle. We have hardly begun such experiments in the sea.

A bright light is the work on experimentally induced changes in size, growth, reproductive effectiveness and time of return of the Pacific salmon, and similarly in the rainbow trout, effected by Dr. Lauren Donaldson of the University of Washington. Dr. Donaldson talks about the north Pacific Ocean as his "fish pasture."

The worst world food shortages, however, are in the tropics.

The milkfish of Taiwan, the Philippines, and Indonesia are being grown in ponds. However, the normal environment for reproduction is not known. Larval fishes from somewhere appear in shallow water and are captured each year to form the base of the hundreds of millions of dollar food industry.

The marine mullet lives in the same region of the world, but cannot be raised to the adult stage. It is raised for food after it passes the critical stages in the ocean.

With few exceptions, we do not know which marine tropical fishes can be farmed. There are 600 families, and at least 15,000 species of fishes known to occur in the ocean. Our systematists find new species almost every time they conduct field studies.

Some of these may be suitable for man. Our knowledge of the full life cycle of commonly harvested tuna species is incomplete, let alone the other less used species.

As an example of the return of benefits from the proper culture of sea organisms, may I mention the oyster? Long claimed and controlled by so-called farmers of the sea, oyster beds may be protected from predators and poachers for a full growing period of 3 to 4 years, and produce up to 400 pounds of meat per acre.

Recently in Japan a new technique has been developed of suspending oysters on long ropes from the surface through 300 feet of water into an active plankton-rich current flowing through the farm. Under such conditions, oyster production has been achieving a yield of 50,000 pounds per acre.

This 100-fold increase has been based on culture methods alone. What could happen if breeding experiments were successful in producing an improved stock? No one knows.

Mr. Chairman, I mention the above facts to introduce the role of the Smithsonian Institution in studies of the sea. Since the opening of our western frontier over 100 years ago, our scientists have accompanied the explorers in order to collect and study the plants, animals, and minerals of our great land. They have contributed immensely to our understanding of the natural history and ecology of our country.

Now we are engaged in studies to "open" the last great frontiers of our planet—the ocean. We continue to gather and to disseminate basic knowledge about the biology, behavior, and distribution of the thousands of species that form the populations of the world.

In this way, our scientists in the Smithsonian contribute towards the achievement of our national goals in oceanography.

The identity of species of marine organisms and adequate knowledge about their biological, behavioral, and ecological characteristics is essential for the development of a rational basis for the nondestructive exploitation of man's oceanic resources.

The Smithsonian Institution has been providing this kind of knowledge for many years. We are building up our national marine study collections to gain the basic knowledge about the plant and animal populations of the oceans needed by scientists and technologists alike in achieving their mission-oriented objectives.

This is a very exacting task, one which requires a specialized training in systematics and many years of experience. By utilizing the basic knowledge about the inhabitants and conditions of life in the sea accumulated by Smithsonian scientists, the mission-oriented Federal agencies are in a much better position to carry on with their operations.

If the Department of the Interior, for example, is interested in introducing a species into a new environment for that species, our scientists may be in a position to provide information about the predators or parasites that may be encountered.

If scientists at the NIH wish to screen certain marine plants and animals in a search for antibiotics or other biologically active substances, our scientists may be able to provide both specimens and knowledge of relationships between populations that may serve as clues to the discovery of new pharmaceutical agents.

On broader ecological questions, our scientists are often called upon to define the scientific problems and search for the basic knowledge upon which to construct solutions.

Recognizing the fundamental biological importance of solar radiation to sustain life in the sea and on the land, scientists at the Smithsonian's Radiation Biology Laboratory are investigating the ecological and physiological effects of changes in spectral distribution of solar radiation resulting from atmospheric pollutants both over land and over sea.

Scientists at our Smithsonian Tropical Research Institute are studying the behavior and ecology of tropical species of terrestrial and marine organisms under natural conditions and how the tropical environment could be affected by man's intervention, as, for example, by constructing an interoceanic sea level canal.

The National Museum of Natural History in the Smithsonian is one of our Nation's great scientific centers for research in systematics. Our scientists and their study collections provide knowledge that is essential for understanding the biodynamics of the oceanic environment.

The Smithsonian Oceanographic Sorting Center serves as a research support organization for marine scientists throughout the world.

Assuring adequate financial support for systematics research is a matter of deep concern to me, especially in view of the rapidly increasing demands for basic knowledge derived from systematic and ecological investigations required in achieving our national goals in marine resource utilization.

In this connection, I wish to reiterate the statement made by Dr. Sidney R. Galler when he testified before this subcommittee earlier this year:

The information gap between taxonomy and the programmatic marine sciences is widening in inverse proportion to the increase in support of oceanography and the related marine sciences. This incongruity can be understood only if one measures available resources in taxonomy against the growing demand for taxonomic data. The increase in oceanographic activity within the last decade, including the increase in the number of collections of marine organisms made from oceanographic ships, has resulted in a tremendous and still growing backlog of specimens waiting to be identified and classified. At the same time, our national resources for taxonomy have not increased to any appreciable extent. Today the front line of taxonomists is a thin one indeed. Even within the Smithsonian Institution, with its relatively large concentration of competent taxonomic scientists as well as with its Oceanographic Sorting Center, it is not possible to keep up with the demand for taxonomic information. As a consequence, our country is unable to derive the benefits it should from the very substantial investment in terms of dollars and manpower in the acquisition of collections and oceanographic data.

Indeed, the world situation with regard to taxonomy is not an encouraging one. Until such time as we recognize taxonomy's essential role and provide the necessary resources commensurate with its high priority, we will find it ever more difficult to achieve some of our important objectives in marine science and technology * * * Increased support, for the urgently needed training of additional taxonomists as well as for taxonomical research, both in the Smithsonian Institution and in universities around the country, is the only reasonable solution to a most serious but little understood problem.

The Smithsonian Institution as one of the remaining bastions of systematics research has been emphasizing the need for its own staff to educate its successors. We are fortunate in having graduate students in residence for work on degrees to be awarded by various universities. The problem of financial support for graduates is, however, a real one, deserving of national attention.

I might add parenthetically, Mr. Chairman, that the Secretary has seen fit to reiterate the statement that I had the honor of making as a private citizen before this subcommittee earlier this year.

I don't think that I need to reread it at this particular juncture, but merely to emphasize again, in connection with the question that was raised earlier this morning by the chairman relating to the long lead time in working up data that had been collected in the Navy (and I might say this extends to other agencies as well), that we must recognize that one reason for that long lead time is the very few systematists that are available today to work up the tremendous mass of material that is increasing constantly as we get more and more involved in oceanic exploration and technology.

Mr. Chairman, I can summarize the Smithsonian Institution's commitment to increase our knowledge of the oceans by quoting from President Nixon's speech delivered in Miami on October 10, 1968:

* * * three questions must be answered before we can realistically begin the exploration of inner space: First, what can we expect to find there? Second, how much of what we find there can we realistically expect to exploit for man's use? Third, what policies must we pursue to carry out best a program of exploitation and investigation? The answer to the first question is as complex as it is exciting.

The President went on to say:

* * * the benefits of the sea will come to us only from sustained and precise investigation of this complex and hostile environment.

The Smithsonian is hoping, in seeking answers to the first question, to assist in finding the answers to questions two and three.

That, Mr. Chairman, is the prepared statement.

Mr. LENNON. Thank you, Doctor.

Doctor, that was a most appropriate speech, and even a more appropriate place for now President Nixon to have raised those questions, and to give the answers to those questions which he did. He could not have done it at a more effective time, or a more effective place.

I think it moved on up to my State, too, the State of North Carolina. I recognize the distinguished gentleman from Oregon.

Mr. DELLENBACK. Thank you very much, Mr. Chairman.

I join the Chairman, Dr. Galler, in expressing appreciation for your coming.

The more I learn about the Smithsonian, the more I realize how much I don't know about it, and the more impressed I become at its broad range of contributions.

There are two things that I would ask you about briefly.

You commented directly on this also in the Secretary's full testimony. On page 3, he commented on the inseparability not only of the atmosphere in the sea, but of the land. You talk in terms of the full planetary environment.

So far as the legislation which is before this subcommittee is concerned, what impact would this feeling about the inseparability of the entire planetary environment be, so far as this bill is concerned?

Do you have any comments on this idea of NOAA, in view of what you have now testified to?

Dr. GALLER. The principal comment that I can offer, sir, is the expressed hope of the Secretary that either this bill or any bill that Congress sees fit to pass and the President to sign will take note of the inseparability of the environment and the atmosphere, including the atmosphere both of the land and sea, and encourage a closer coordination of both the science and the technology that today tend to be somewhat separated in many agencies both in and out of Government.

Dr. DELLENBACK. Do you view that to be desirable, to take what is oftentimes today quite fragmented research in individual aspects of the land, individual aspects of the sea, and individual aspects of the atmosphere, and to a degree bring together the work that is being done in these fields? Would it be beneficial if they were working more closely together?

Dr. GALLER. Undoubtedly, sir, it would be highly beneficial, and in the best interests of our country, and in the best interests of mankind.

We are encouraged by the establishment by the President of the United States of this Council on Environmental Quality. I believe that is in recognition of the need to draw these pieces together, and to plan a coherent national policy and program.

Mr. DELLENBACK. Recognizing that if we really took the entire planetary environment and tried to wrap up in a single package every conceivable aspect of the entire environment, it would become a tremendously complex thing that would embrace a great deal more than the bill which is before this subcommittee embraces, could you see advantage to going as far initially as NOAA proposes to go to bring together at least some aspects of this; not going as far, certainly, as we might ultimately go, and in any way thinking about departmentalization that will cut it off from that which is not within the grouping, but do you see value in the type of amalgam which NOAA consists of?

Dr. GALLER. With your permission, sir, I would like to respond in a somewhat circumferential way.

Mr. DELLENBACK. The question was somewhat in that strain.

Dr. GALLER. I think that there is advantage in any action taken either at the Legislative level or the Executive level that focuses attention on the need to bring together our knowledge and our interests on the central problem of maintaining the quality of the total environment.

To the extent that any piece of legislation does encourage that pulling together of what today are diverse and separated interests, yes, sir, there is advantage.

Mr. DELLENBACK. Although the Smithsonian has apparently devoted most of its efforts in this field to searching out basic knowledge from which applications will flow—and I am not suggesting changing the Smithsonian's operations at all—is there any great advantage in separating research for basic knowledge and applications of that knowledge? Or might not there be under some circumstances desirability to at least some overall blending of basic research and applied research?

Dr. GALLER. Mr. Chairman, may I respond to that question on a personal basis, venturing a personal opinion, not as a representative of the Smithsonian Institution? Do I have your permission?

Mr. LENNON. Yes, sir.

Dr. GALLER. It has been my experience, sir, that there is not necessarily a direct correlation between the acquisition of new knowledge and the application of that knowledge in technological advances, and the juxtaposition of basic research and applied research.

Let me clarify that, if I may, and I fall back on my previous experiences in the Navy, especially my associations with the Office of Naval Research, and I should say immediately very happy and very challenging associations.

I would like to submit that the Office of Naval Research was engaged in the support of fundamental investigations among many academic institutions throughout the United States. It was fundamental research, but it had a mission-oriented objective. It was to acquire knowledge to advance the Navy's mission.

In the course of my years of being associated as the head of the biology branch of ONR, and in that capacity being in charge of what we called the hydrobiology program, involving biological research, we came up with a number of potentially important technical advances based on fundamental science that the Navy had paid for that never really saw the light of day, and I want to emphasize that here we had in my view, at least, an organization that on the charts at least showed a smooth communication flow from the very basic level up to the wet Navy application.

But in practice, there were many cases where for admittedly obscure reasons, the technical advances could have played an important role both in facilitating applied research and in actual applications, never saw the light of day.

For example, I had the privilege of being associated with this subcommittee, and with a number of distinguished confreres, some of whom are in the room today, particularly Dr. Wallen and Professor Bauer, in developing the concept of research ships of opportunity.

I think the fact that the research ships of opportunity concept led to three demonstrably successful field experiments is a credit more to

the efforts of this subcommittee than those who were directly connected in the Navy at the time.

We absolutely were able to demonstrate the great economies both in time, manpower, and monies that could be effected by making use of our merchant marine to carry research vans, enabling scientists to collect oceanographic information while the ship was under way on a not-to-interfere basis, giving us intensive patterns of data that today we still do not have.

So we proved it, and it has yet to be accepted as an important technical tool for research and application.

Another example was the development of what we now call remote sensing devices, the establishment of the world's first underwater audio-video observatory, that enabled scientists to sit in a laboratory and see what was going on in the oceanic environment, and to listen to what was going on, and to record those events, and to actually have the means for controlling the hydrophones and the underwater video to concentrate on sectors of the oceanic environment.

That was a terribly important tool for studying such practical things as the effectiveness of sharp repellants, the effectiveness of certain kinds of marine antifouling devices and substances, et cetera. That was demonstrated to be feasible, valuable. It has yet to find its way into the armory of technical tools for research and application.

This is a long way of responding to your question, sir, but I merely wish to point out that whether the research is in the same organization as the application, or in a separated organization, organizational juxtaposition does not necessarily insure that there will be an orderly and expeditious transfer of basic discovery and application.

Mr. DELLENBACK. I read you as saying at the same time, Doctor, that it would be desirable, viewed from our overall national interest, to have increased coordination between the pure research and the application.

Dr. GALLER. Absolutely.

Mr. DELLENBACK. That the present system is failing to achieve the ultimate desirable potential, and in the examples you alluded to some specifics

Dr. GALLER. In my personal opinion, yes, sir.

Mr. DELLENBACK. Would you say also that there is desirable potential in a blend over and above that which is existent at the present time between that which Government does and that which the private sector of the economy does, either in research or at least coordination between what is done in some governmental units and what private industry is doing? Would you say also, moving into this field of application, that there could be value derived from improving the blend of governmental input and private enterprise input?

Dr. GALLER. My personal strong "Yes."

Mr. DELLENBACK. And you would feel, also, I gather from a comment that was made in the remarks you made on your own behalf and on behalf of Secretary Ripley, that increased funding is an essential both for basic research, and I suppose beyond basic research, for the application.

Dr. GALLER. Sir, I can state both personally and officially yes, indeed.

Mr. DELLENBACK. Without asking you, then, to make any more direct comment on the NOAA concept per se, I am pleased, Mr. Chair-

man, that this very able witness has eloquently alluded to the benefits with which flow from NOAA in this increased coordination between the study of areas, between basic research and the application of research, between Government work and private sector work, and then the increased emphasis that would be placed on this whole package, which is an essential to leading to the increased funding necessary to accomplish that which we seek to accomplish.

I ask for no comment on that. That is my summary of what I think has been very helpful and very eloquent testimony.

Thank you very much, Doctor.

Dr. GALLER. Thank you, sir.

Mr. LENNON. Thank you, Mr. Dellenback. I commend you. I wish it had been possible for you to have been here to question our distinguished Director of the National Science Foundation, Mr. McElroy.

I recognize the distinguished gentleman from Michigan, Mr. Ruppe.

Mr. RUPPE. I have no questions, but I wish to commend the gentleman for a most excellent and informative statement.

Dr. GALLER. Thank you, sir.

Mr. LENNON. Doctor, you heard my question to Dr. McElroy concerning funding for fiscal 1968 and 1969 in the budget request.

I know we are dealing with an entirely different type of organization in the Smithsonian, but there is Federal funding to the Smithsonian Institution?

Dr. GALLER. Yes, sir.

Mr. LENNON. Could you or either of the gentlemen with you give us the actual Federal funding for fiscal 1968 and 1969, and the budget request for fiscal 1970 for the Smithsonian Institution?

Dr. GALLER. May I ask my colleague, Dr. Wallen, to respond to that?

Mr. LENNON. You can submit the figures for the record, but can you approximate it?

Dr. WALLEN. Mr. Chairman, I can give only an approximation, but I will be glad to furnish it for the record.

Mr. LENNON. If you would, please.

(The information was not supplied.)

Dr. WALLEN. Perhaps before I say this I should preface it with the remark that the Smithsonian has quite a number of bureaus, and that the budget which I wish to report to you is an additive budget, which is not entirely identified as the separate budget of the Office of Oceanography, but funds that are contained within the bureaus.

Mr. LENNON. Talking about the Smithsonian Institution as a whole?

Dr. WALLEN. Yes.

As a whole, the total amount requested, approximately, in 1968 and 1969 and 1970 was essentially the same, approximately \$2.8 million. The amount of money appropriated in each of the first 2 years was approximately \$2.5 million.

The amount of money requested from the Congress in 1970 was approximately \$2.6 million.

Mr. LENNON. The reason I asked that is that while you just could not find it in figures related to the National Science Foundation approximation of anywhere from \$450 million to a half billion dollars, is there any possibility that there is an overlapping or duplication in the

contribution that the Smithsonian Institution makes in its scientific studies and those being made by the National Science Foundation?

Dr. GALLER. May I respond to that, Mr. Chairman?

Mr. LENNON. I don't think there is, but I want the record to show it.

Dr. GALLER. There is no duplication, and I can say that as a matter of fact we very frequently invite the National Science Foundation to associate itself in helping to support some of the research activities in the various sciences sponsored by the Smithsonian.

Mr. LENNON. Thank you, sir.

The gentleman from Florida.

Mr. ROGERS. Thank you, Mr. Chairman.

Mr. LENNON. Off the record.

(Discussion off the record.)

Mr. ROGERS. Dr. Galler, it is good to see you again. You have been most helpful to this committee over the years in consideration of legislation in this field. I will read your statement.

It is my understanding from dialog already on the record that, although you are not coming out specifically recommending the organizational setup as the Commission has so recommended, nevertheless you can see the advantage of centralizing some of our activity.

Dr. GALLER. May I respond?

I think that there is not only an advantage, but an urgent requirement for a more careful, closer coordination of the activities that our Nation engages in both at the Federal level and in the private sector in the field of marine sciences.

Mr. ROGERS. Thank you very much. It is very helpful.

Thank you, Mr. Chairman.

Mr. LENNON. Thank you.

Dr. Galler, with your background and your association with the Smithsonian Institution and before that with the Navy, I would like your evaluation and judgment on the capability of the gentlemen who composed the Commission, beginning with Dr. Stratton, to make the study that they made, and the evaluation and the findings and conclusions and the ultimate recommendations they made in the Commission.

I think it is a very splendid Commission. I am not a scientist. I never knew any one of these gentlemen before they became members of this Commission, but I was greatly impressed with the time and effort and concern they gave this study.

I think you heard me say before that as soon as the bill was signed into law, I requested Mr. Mosher to join with me in a letter to the President asking him, whatever time it took, to find the men who had the background and who could give the time and would give the time, and I suggested to him even before he made the appointments of these people, that he make the decision that these people be contacted to see if they would be willing to give the time. We knew it would take at least 2 years, or a good part of that 2 years.

Do you have anything you would like to say for the record about your judgment of these men who made this study and this report?

Dr. GALLER. Mr. Chairman, what I am about to say is really a redundancy, but I am delighted at being able to restate that, and I say this not only for myself but also for Secretary Ripley.

The Commission and its individual members were outstanding. In addition, I would say that not only was the outstanding performance

a consequence of the competence and diligence of the individuals, but also by virtue of the bringing together of what had been separated points of view from science and industry, from Government and universities, and the Federal agencies that were mission-oriented and non-mission-oriented.

It provided a magnificent opportunity that was fully realized for melding these divergent views and opinions and forging a report that is truly an outstanding contribution to the country in the marine sciences.

Mr. LENNON. Would you agree with me that they have stimulated a number of our Government agencies in the direction that we all hope to go in the national interest related to the oceanic environment?

Dr. GALLER. No question that that is true.

Mr. LENNON. Regardless of what may be done as a result of the legislative and executive action?

Dr. GALLER. I might say that my colleague, Dr. Wallen, just noted sotto voce, that the Smithsonian was one of the groups that had been stimulated.

Mr. LENNON. You don't need any motivation or any inspiration or any suggestion that you be moved into some agency, but I think it has stimulated a lot of agencies to move in this field.

Dr. GALLER. It has, sir.

Mr. LENNON. I get the word every day.

Thank you, gentlemen.

Mr. Counsel.

Mr. CLINGAN. Have you, Doctor, and your associates, had an opportunity to examine H.R. 12347?

Dr. GALLER. Yes.

Mr. CLINGAN. Have you any suggestions or comments to make as to specific recommendations?

Dr. GALLER. Yes, sir, Mr. Clingan.

May I defer to my colleague, Crane Miller, who has examined the bill in its specifics.

Mr. CLINGAN. Mr. Miller, have you reduced these comments to writing in any way?

Mr. MILLER. Yes, I have, which I would like to offer at this time.

Mr. Chairman, I would like to offer some personal comments on certain social and environmental research implications of the Commission's report, and to propose some changes in H.R. 13247, which I feel might strengthen it.

The Commission report, as well as this bill, called for a comprehensive, coordinated, and continuing national program in marine and atmospheric science, technology, and technical services for the benefit of mankind.

The report, and the Commission's panel reports, were organized and written not only with science and technology in mind, but also the social problems inherent in man's use of resources and the use of the marine and atmospheric environments. Thus, legal, economic, political, and other social implications, in addition to science and technology, permeate the report.

Mr. LENNON. Right at that point, Doctor, can you separate these things? I don't see how they can be separated. Do you?

Mr. MILLER. No, sir. I don't and this is one of the points that I want to make here, that it does not clearly come through in the bill, with its emphasis on science and technology, that there are economic, legal, and political considerations.

Mr. LENNON. Go ahead with your recommendations.

Mr. MILLER. Section 104(a) (1) authorizes the advancement of fundamental understanding of the biological, physical, geological, and chemical characteristics of the marine environment, and of the atmosphere.

Section 104(a) (2) authorizes the development of fundamental technology to achieve more effective use of the marine environment and to operate with greater efficiency and safety in the atmosphere.

I feel that there is a concomitant need to advance our understanding of social processes related to the marine environment and the atmosphere.

By "social processes" I am speaking of the values men apply, the institutions we create, the resources we use, and the resulting impacts or residual effects we have on these environments.

The commission's report was concerned with a large percentage of the earth's total environment. It was not simply addressed to a special interest group to promote the ocean and atmospheric industries, nor did it equate the benefit of mankind solely with scientific or technological research and industrial development.

The report addressed the need to understand the marine and atmospheric environments, to understand the impact of man's technology and activities upon those environments, and his interaction with them.

Clearly, the commission was talking about an environmental agency in a dynamic sense of the term—an agency concerned with the use of the marine and atmospheric environments with understanding and appreciation of our relationships with these environments and the consequences of our use of them.

Thus, I would like to offer and submit for the record some proposed changes in the language of the bill, that would clarify an intent here.

Mr. LENNON. Are you full-time counsel for the Smithsonian Institution?

Mr. MILLER. Yes, sir, and was also on the staff of the commission.

Mr. LENNON. I just wanted to get that in the record. My understanding was that you were.

You may proceed.

Mr. MILLER. I have prepared here and submit for inclusion some proposed changes that would indicate the explicit need for concern with the social processes much the way that Dr. Carl Auerbach was concerned with international political institutional problems, that Dr. Crutchfield was concerned in the use of resources and brought in his vast knowledge of the economics of resource conservation, and Dr. Knauss in his panel report on the coastal zone also had concern here for not only the science and technology involved, but also the social and political concerns.

(The material follows:)

PROPOSED CHANGES TO H.R. 13247

Section 102(a)

The Congress declares that it is the policy of the United States to encourage, develop, and maintain a comprehensive, coordinated and continuing national

program in the marine and atmospheric environments for the benefit of mankind, including the scientific, technological, technical services, and social processes related thereto, through the enhancement of commerce, transportation, and national security; the protection of health and property; the enhancement of our commercial fisheries; and the increased use and management of these and other resources. Such a national program should be conducted so as to contribute to the following objectives:

"(1) The accelerated development and use of marine resources, consistent with sound management practices and in knowledge of the effects of such development and use on the marine environment.

* * * * *

"(4) The development and improvement of the capabilities, performance, use, and efficiency of vehicles, equipment, and instruments for use in exploration, research, monitoring and prediction, surveys, the recovery of resources, and the conversion, transmission, and residual effects of energy in the marine and atmospheric environments.

"(5) The advancement of education and training in marine and atmospheric sciences, technology, technical services, and social studies related to the marine and atmospheric environments."

Section 104(a)

[New] (3) *The advancement of understanding of the social processes by which man uses marine and atmospheric resources and interacts with the marine and atmospheric environments.*

[Old] (3) *The enhancement of United States fisheries * * * (4) * * * to marine and atmospheric sciences, engineering, and social processes related to the marine and atmospheric environments.*

Section 105(2) (B) * * * to recruit specially qualified scientific, engineering, and other professional talent, he may establish the entrance grade for scientific, engineering, and other professional talent, he may establish the entrance grade for scientific, engineering, and other professional personnel * * *

Section 105(5) * * * to accept, hold, administer, and utilize gifts, devises and bequests of property, both real and personal, for the purpose of aiding or facilitating the work of the Agency and such gifts, devises, and bequests of money and the proceeds from sales of other property received as gifts, devises, or bequests shall be deposited in the Treasury in a separate fund * * *

Mr. LENNON. One of the things that has concerned the members of the committee with respect to the recommendations of the commission as to the so-called establishment of coastal zones is that it is not very clear or they don't suggest very clearly how we should proceed.

The commission did not have on their staff that I knew about a legislative draftsman counsel.

I might say that the legislation that counsel here referred to was the consensus of every member of this subcommittee. We had to take the only specific recommendation that they gave with respect to the Government structure, the national council and so forth, and we would be delighted to have you work with the counsel of this committee by reason of your background and your association with the commission if we need your assistance.

We went to the point, as I believe you gentlemen know, that we have scheduled here for October 28 and 29 a 2-day symposium to which we have invited, through the respective Governors of those States at least two individuals representing the marine science council or the department of conservation and development, or both, to come here and participate in the forum to see if we can't relate to them or have them relate to us just how they feel about the commission's report, particularly in this area regarding the coastal zones and regional laboratories as to just how it should be treated or oriented.

We don't know whether or not it should be done on the basis of a regional coastal zone or regional laboratories, whether it would have to be done with an interstate compact approved by the Congress or just how.

That is what we are trying to explore.

I want you to know again how much we appreciate your doing what you have offered to do here today in the suggested language.

You go right ahead. We have a few minutes.

Mr. MILLER. I can close here very quickly, Mr. Chairman.

One of the administrative legal tools that I think would be very useful, if the National Oceanic and Atmospheric Agency were created, would be be explicit authorization to make grants, contracts, loans, and other arrangements for fundamental scientific technological and social research.

With the exception of the National Sea Grant college program which has authority to initiate programs and make grants in various fields relating to the development of marine resources, each of the agencies proposed to be included in the NOAA has authority to make grants for basic scientific research under Public Law 85-934. But the authority under Public Law 85-934 is not sufficiently broad to cover an expanded range of concern that includes the advancement of fundamental studies of technology and social processes related to the marine and atmospheric environments, so that I would like to suggest adding a section to the bill to insure that the agency does have that authority, which might read something as follows:

The Administrator is authorized and directed to initiate and support fundamental scientific, technological, and social research related to the marine and atmospheric environments, and is authorized to make contracts and other arrangements (including grants, loans, and other forms of research assistance) to support such research.

That is the end of my comments, Mr. Chairman.

Thank you.

Mr. LENNON. On page 242 of the report, and it is related, of course, to the testimony of the preceding witness, Dr. McElroy, the Commission has this to say:

The transfer of the Sea Grant Program to NOAA would not impair the National Science Foundation's (NSF) capabilities to perform its normal functions of research and science education support. However, it would enable NOAA in conjunction with its other functions to sponsor a wide range of highly useful applied marine science and training activities in cooperation with universities and industry. * * *

The Commission would place responsibility for institutional support of University-National Laboratories in NOAA. This should free NSF to use its limited funds to support project research activities.

Now, I don't suppose you would be willing to comment on the first quote that I made from that report, or would you be willing to comment on it?

You heard the testimony of Dr. McElroy. I have every reason to believe he is supported in this by Dr. Abel, although I didn't pin him right down.

Would you comment on that, or would you rather not comment on either of these two excerpts from the Commission report related to the transfer into NOAA of the Sea Grant college program?

If you would rather not do it, I am not going to insist. I know you have to work together.

Mr. MILLER. I would generally prefer not to comment directly on Dr. McElroy's testimony, but would like to say this.

Mr. LENNON. Comment on the Commission's report, not on what Dr. McElroy said.

Mr. MILLER. I am in general agreement with what is contained in the report of the Commission.

Mr. LENNON. That is some support.

Mr. DELLENBACK. We will settle for that.

Mr. LENNON. Do you want to ask a question?

We are delighted to have had you gentlemen here today. You may be assured that the subcommittee and the counsel will not take directly what you said, but if you would hand him your statement, I would appreciate if you would have lunch together and kick this thing around.

Mr. MILLER. It is always a pleasure to have lunch with Tom.

Dr. GALLER. Thank you very much.

Mr. LENNON. The committee will resume its hearings tomorrow at 10 a.m. in this room when our prime witnesses will be representatives of the National Security Industrial Association and the National Oceanography Association. We look forward to having them.

(Whereupon, at 12:10 p.m., the subcommittee recessed, to reconvene at 10 a.m., Thursday, October 2, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

THURSDAY, OCTOBER 9, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:10 a.m., pursuant to call, in room 1302, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. ROGERS (presiding). The subcommittee will come to order, please.

First of all, I would like to say that the chairman, Al Lennon, asked me particularly to express his regrets for not being here at the beginning of the meeting because of a Medal of Honor ceremony at the White House. He plans to be here as soon as that ceremony is over because he particularly wanted to hear the views of this witness.

The committee is delighted to welcome back the distinguished Lieutenant Governor of California, a former member of this committee, and one of our colleagues who took an active interest in this committee and its activities and who has made a real contribution in this field.

We are particularly honored to welcome you, and I know that all of the members of the committee share my feelings, not only as Lieutenant Governor of California but as our good friend and former colleague. We are honored to have you, Lieutenant Governor Ed Reinecke.

STATEMENT OF HON. ED REINECKE, LIEUTENANT GOVERNOR OF THE STATE OF CALIFORNIA, AND CHAIRMAN OF THE CALIFORNIA ADVISORY COMMISSION ON MARINE AND COASTAL RESOURCES

Mr. REINECKE. Thank you, Mr. Chairman.

Needless to say, it is a new experience for me to sit on this side of the table. It is kind of spooky as a matter of fact, but I am very, very pleased to be back and to have this opportunity to see you gentlemen and hopefully to contribute a little bit to something that I know we all share with a great deal of interest and enthusiasm.

I guess I should start by apologizing. I don't know that everybody has a copy of my statement.

Mr. ROGERS. Yes, I think we do.

Mr. REINECKE. I am glad you do because I understand that some of the people in the room did not get their copies. They were mailed a while ago, but it seems that the Wells Fargo Express is still carrying the mail out of Sacramento.

My name is Ed Reinecke. I am presently Lieutenant Governor of the State of California, and just previous to this I was a member of the House, and in fact was a member of this subcommittee which I now have the privilege to address.

As a member of this subcommittee, I had the good fortune to observe the rise in interest in fields related to the ocean and coastal zone, and have had the opportunity to meet with many of the leaders in Government, industry and education concerning the role of the United States in properly conserving and managing these precious resources of our Nation and coastal States.

I appear before you today primarily to discuss H.R. 13247, but because of the background of this bill, I wish to comment briefly upon the monumental publication, "Our Nation and the Sea," the report of the Commission on Marine Sciences, Engineering and Resources to the President and Congress—stimulating and realistic in its outlook; imaginative and forceful in its recommendations.

This document has been reviewed and reported by many individuals and California State agencies in far more detail than I am able to provide. However, I wish to state briefly that the resources agency, in particular, has found this a remarkably important document and has strongly endorsed many of the commission recommendations which bear upon problems of special interest to California.

I would like to commend Chairman Lennon and certainly my colleague Charlie Mosher for the contribution that they made to the report and to this commission. It was a very notable thing.

This very important and significant bill, H.R. 13247, is a direct and timely result of the recommendations in "Our Nation and the Sea," so it perhaps is fitting then to comment with respect to the extent that these recommendations are implemented.

California has, for some time, actively supported marine-oriented programs. In particular, the State has called for intensive efforts in the field of ocean-oriented planning and in the review of existing programs with the intent to provide for the wise use and development of marine resources.

Several State agencies have been producing single interest plans for fish and wildlife, for shoreline recreation, for small craft harbors, and so forth, and have recently joined with the Interagency Council for Ocean Resources (ICOR) to assist in the preparation of a Comprehensive Ocean Area Plan in which all of California's interests in the ocean area will be represented, differences recognized and reconciled where possible, and integrated programs recommended for implementation.

ICOR was established by order of Governor Reagan, following passage of legislation calling for the preparation of a Comprehensive Ocean Area Plan (COAP) and for the establishment of a new commission made up of representatives of the private sector and State legislators to advise the Governor on marine and coastal matters, including a review of the COAP as it was prepared by ICOR.

ICOR is composed of the five Cabinet Secretaries and myself from the executive branch of State government. It operates to approve development of the Comprehensive Ocean Area Plan which is presently funded by State and Federal planning money (\$170,000). The planning team is composed of professionals in resource management and

planning with supporting staff. As chairman of ICOR I have a personal interest in the development of all ocean-oriented matters.

The new California Advisory Commission on Marine and Coastal Resources continued the activities of the former nonstatutory Governor's Commission on Coastal Resources (GACOR), but because it is now funded and charged with specific responsibilities by law, it has become much stronger and more influential in reviewing and guiding California's marine and coastal activities. It is funded by State money.

Governor Reagan has also taken a first step towards the establishment of a coastal zone authority, by calling for a reorganization of State government which was approved by our legislature this year. This would provide for an enlargement of the responsibilities of the Department of Harbors and Watercraft to include other, and I might say all, marine matters. This new department, named Navigation and Ocean Development, would also be charted with implementing the COAP.

California is alert to the national developments, and is ready to work with the Federal Government in facilitating the coordination of the activities of NOAA with California, and looks forward to Federal legislation which will provide for such coordination.

Creation of a NOAA along the lines suggested by this bill will result in great strides towards solution of marine and coastal problems. However, attention should be given in this bill to the mechanism by which NOAA can coordinate with the coastal States in the planning, management and implementation phases of the many programs which must be carried out jointly by Federal, State and local agencies and the private sector in the coastal zone.

The major objectives to be accomplished by this legislation are (a) establish the Federal organizational pattern for ocean matters; (b) establish the means by which the States and the Federal Government can work to the mutual benefit of ocean science; and (c) to provide adequate funding to get the national program in motion.

The Commission report called for a Coastal Management Act which would provide policy objectives for coastal zone functions of the State government and authorize Federal grants-in-aid to facilitate the establishment of coastal zone authorities (CZA) empowered to manage the coastal water and adjacent land.

We would consider this very essential to the legislation in order to make NOAA viable, and strongly recommend that this bill include provision for a coastal management act together with adequate funding.

From the State's viewpoint, a coastal zone authority would offer the opportunity to plan and implement programs designed for optimum utilization and conservation of the coastal zone resources.

The new California Department of Navigation and Ocean Development, when fully organized, could very well serve as the CZA and would implement the California Comprehensive Ocean Area Plan now being prepared.

As this plan, partially funded by grants from Housing and Urban Development, proceeds, California will have identified numerous coastal zone problems together with recommended action programs to solve these problems. It will be at this point that State and Federal cooperation is vital to accomplishment of the plan's objectives.

This bill, H.R. 13247, speaks directly to the major problems which face the United States in the conservation and use of the ocean resources. Properly, the bill emphasizes those policies and objectives which will provide a framework for action programs, at both the national and State levels.

California endorses these policies and objectives—their implementation will go a long way to insure U.S. leadership in marine resource development and conservation. Perhaps, with reference to the term “conservation,” it might strengthen the bill to make specific reference to conservation and wise use of the ocean’s resources, and to the maintenance or enhancement of environmental quality, on page 2, line 15, and again on page 4, as a further objective of the bill.

This is implied in the present language; however, in view of the major emphasis on these points in the Commission report, and the high level of public concern for legislative action with respect to problems of recreational and environmental quality, we feel that some explicit reference and stronger emphasis should be in this bill concerning these points.

One of the major areas of discussion in the report, “Our Nation and the Sea,” had to do with the quality of the environment in which we live. The report considered pollution from all sources, and the problem was seen to be so staggering that a recommendation was made for a total integrated approach to the problem of air, land and water pollution, including the establishment of a national commission.

The marine pollution problem is, of course, part of a larger problem—the distribution through water and air of pesticides, lead compounds, sewage, combustion products and other effluvia, will result ultimately in the degradation of the marine environment.

California calls for specific effort to maintain and improve the quality of this marine environment. Creation of the National Oceanic and Atmospheric Agency, as proposed, is not in itself an adequate recognition of the special importance of the ocean as the ultimate cumulative repository for the waste of every human and industrial act, wherever conducted.

Consider that in particular the activities of the National Oceanic and Atmospheric Agency (NOAA) itself, through its charge of development and use of resources in the ocean, may lead to a major portion of potential environmental degradation. Therefore, we recommend that a special provision be included in this bill which will direct the Federal Water Pollution Control Administration (FWPCA) to review and approve all actions of NOAA which may involve environmental modifications. This is not inconsistent with a present executive order requiring FWPCA review of Federal projects, and it may be well to further emphasize the role of the FWPCA in this bill.

Perhaps there could be a restructuring of the FWPCA—the creation of an Office of Marine Pollution, similar to the Office of Saline Water now in the FWPCA, a review body to specifically focus attention and effort toward solving marine pollution problems in cooperation with NOAA.

The FWPCA review and approval process should be coordinated with the coastal States in such a way that the States own processes of review and approval of marine-oriented projects are included and enhanced, not diminished.

The area of recreation is of course closely tied to environmental quality—yet there are problems here, other than pollution, which have to do with esthetics or with simple access and availability with which the proposed NOAA has apparently little direct concern.

In this case, as in the case of pollution mentioned earlier, NOAA will be a major modifier of the environment, and as such should clearly be directed to consider environmental quality. NOAA should have its programs specifically reviewed and approved by agencies such as the Bureau of Outdoor Recreation (BOR), or the Department of Housing and Urban Development (HUD), to insure that modifications, particularly coastal, do not conflict with Federal, State, or local planning objectives.

In fact, NOAA should be specifically charged with furthering the Commission's recommendation that public recreation and access to water be included in urban planning, with Federal grants to be contingent upon such provisions.

The inclusion of the Bureau of Commercial Fisheries and the marine and anadromous segments of the Bureau of Sport Fisheries and Wildlife wisely places in NOAA the agencies responsible for the conservation and management of our Nation's living marine resources.

Control of the nonliving resources is somewhat more complex, but it does appear essential that Federal programs having to do with marine mineral resources development be included in NOAA.

Specifically, we recommend that the marine minerals programs of the Bureau of Mines be transferred to NOAA. These efforts would be particularly important within the NOAA framework, and would be of special importance to California.

I might note at this point our great concern in California that the marine minerals program of the Bureau of Mines, based at Tiburon, has been greatly reduced to the detriment of our needs in this area.

The problems of oil and gas exploration, leasing, and development are tied to so many Federal agencies, that is, the FWPCA, Bureau of Land Management, U.S. Geological Survey Branch of Oil and Gas Exploration, and others, with a major orientation toward land-based operations, that some consideration should be given to including within this bill provisions for coordination between NOAA and these agencies regarding the use of offshore oil and gas resources.

One way this might be done would be to give NOAA the authority to write or approve the offshore drilling regulations which should be developed in cooperation with the CZA, and of course be consistent and compatible with the master plan of the contiguous States.

Such an approach may very well help reduce the chances of another "oil spill" such as occurred earlier this year in the Santa Barbara Channel.

Most of these matters involve both State and national interests, going far beyond boundaries of a single State. Federal funding must be made available to the operation of NOAA, and in a large proportion to the funding of the CZA. The CZA, managing programs inseparably bound to Federal planning and implementation, must as a consequence receive some Federal support.

This funding, of course, is essential and I am concerned that, if the only funds available are those which transfer with each agency into NOAA, then there will truly be no room for imaginative, vigorous

new approaches to the solutions to marine problems. In fact, the separation of certain functions from their parent agency without an increase in funding could precipitate disaster. Substantial funds will be needed to support coastal zone authorities.

Accordingly, it is strongly recommended that specific provisions be included in this bill to fund NOAA as a separate budget item. The appropriation hopefully will include a significant increase in the fiscal support of each agency concerned, in order that NOAA may work effectively. Funds could be appropriated from income received from marine activities, i.e., mineral and oil leases and royalties from tide and submerged lands and the like.

The great research effort exerted by the Department of Defense in the marine environment, and the relatively small amount expended by Federal nonmilitary agencies in the same area is an area of concern.

We suggest that a straightforward support and funding of nonmilitary agency research efforts in the marine environment would go far faster to the heart of the matter and further the national interest in the sea to an extent greater than the purely military approach. We depend too much on spinoff from military oriented research with the accompanying timelags.

Why not, for example, even though the private sector has provided valuable contributions, further support the private sector research on submersibles, underwater construction, deep water transportation, navigation aids, electronic fish finders, mineral location and recovery, improved environmental prediction systems and pollution abatement. Department of Interior research programs would appear to be vital to our Nation, and certainly may be oriented toward the special needs of coastal States much more readily than military activities.

In order to place the proper planned emphasis and priority on marine research, it is firmly recommended that the authority for making marine research grants be transferred from NSF to NOAA or, at the very least, that NOAA be represented equally on any NSF discussions of research funding in this area.

Ocean effort is not truly to be compared with that of space.

Certainly there are massive ocean projects requiring sophisticated equipment in many ways similar to space projects; however, the ocean and coastal zones afford innumerable opportunities for small enterprises. This very nature of the coastal zone—including, as it does, gradual changes in water depths and coastal configurations, provides for an infinite variation in the uses to which the resources in this transition zone may be put, with a corresponding opportunity for small as well as large enterprise to participate.

This concept calls then for a program of fragmented research, not necessarily a few large-scale special-interest programs but projects directed specifically to ways in which the small operator may participate, i.e., culture and harvest of marine organisms, new ways to mine inshore waters, to clean up harbor oil spills, to improve navigation, to find fish, to provide public opportunity to observe and participate in marine-oriented activities, through provision of access, facilities, equipment, and so forth.

At this point I would like to say that you have had testimony from the National Academy of Engineering, and I would like to strongly

endorse the statements that these gentlemen have made to you in terms of mission-oriented research, as well as purely the scientific research.

I think it is important that we recognize the difference and implement both to the extent possible.

Projects such as these may be initiated and carried out in large part by private enterprise in cooperation with appropriate governing bodies. These potential activities of private interests should be considered in Government planning, and any private development or use should of course be compatible with the comprehensive ocean area plans of the CZA.

The State and private enterprise must have an opportunity to participate also, and I suggest that here again is where the CZA may serve in an important capacity by giving the Federal Government the opportunity to provide advice and liaison to all interests.

The great U.S. highway systems linking our urban areas, and the complex urban transportation systems themselves, all lead ultimately to the air and to the sea. We would take this opportunity to recommend that NOAA specifically be charged to coordinate with the Department of Transportation and with planning groups in HUD concerning the transportation aspects of land-sea or air-sea interface.

However, significant programs in marine science education are also sponsored by the Department of Health, Education and Welfare and by the Smithsonian Institution. Specifically, special training by other departments (Commerce, Defense, Interior and Transportation) are also conducted. We therefore suggest that the marine science education and training functions of all of these non-NSF departments be reviewed and, where feasible, transferred to the jurisdiction of NOAA, or at the very least coordinated with NOAA's determination of needs.

It occurs to us that, generally, whenever an agency with ocean oriented activities is not included within NOAA, yet there is a need for its research and administrative functions, that NOAA should be required to contract with the appropriate agency, e.g., FWPCA, BOR, Bureau of Mines, branch of Oil and Gas, NSF, and so forth, concerning a pollution control operation.

In this way one can insure that the potential of the agency with the special research talents and facilities is realized, and that close coordination is maintained between NOAA and agencies with allied or overlapping interests.

This concept could result in a greater awareness of the special problems in the marine area, and can lead to a review mechanism by which marine research programs may be coordinated between NOAA and the appropriate agency, and reduce the possibility of duplicating research effort.

Considering the tremendous complications now inherent in the siting of powerplants, particularly nuclear, but with problems of thermal effects, esthetic impact, and actual or potential air and water pollution common to all, I firmly recommend that the CZA be given the authority to participate in the selection of powerplant sites, and that in applicable cases no AEC license would be valid without CZA approval.

This would provide the best mechanism to insure that State and local interests are considered when nuclear plants are to be located, and

would appear to effectively insure that the Federal role in promoting health and safety, as well as in conserving and managing areas of the environment and living resources as assigned to NOAA, would be maintained as well as coordinated with the State position.

This of course presupposes that the Coastal Zone Authority would be so constituted so as to fairly represent the position of all State interests concerned with powerplant siting within the coastal zone.

California presently has a powerplant siting committee representing a number of State departments. This committee, working with the utilities and conservation groups, has assisted in locating powerplants with a minimum of adverse environmental effects.

The activities of this committee will be coordinated through the new Department of Navigation and Ocean Development, which in California would function as the Coastal Zone Authority implementing the master plan.

Both living and non-living resources are presently, or soon will be, taken in offshore areas where many problems of Federal, State and international jurisdiction remain to be solved. In fact the problems of jurisdiction and management which exist appear to have hindered development in some cases.

Reviews and studies of the legal problems arising out of the management and use of the marine environment, and of the national policies with respect to the outer continental shelf, are being conducted by the National Council on Marine Resources and Engineering Development and by the Public Land Law Review Commission.

The establishment of a cohesive national policy in this complicated and internationally very important area involves the coordination of many branches of the executive department and, certainly, the Congress.

NOAA should conduct this coordination and function as the catalyst for suggesting and bringing about creative changes to existing laws and policies to permit further offshore development.

The final question then is to whom does this agency report? Whether as an independent agency directly to the President or to a Cabinet Secretary, or finally to a council of interested Cabinet Secretaries, may best be resolved in terms of the political necessities of life and full support from the administration.

The challenge facing this proposed new agency is tremendous, yet it is apparent that action must be taken to provide the opportunity for the United States to take and maintain leadership in marine affairs. This bill certainly will go a long way toward providing that opportunity.

California endorses wholeheartedly the concept of NOAA and the need to coordinate with the State planning agencies through a CZA, and urges swift passage of the necessary legislation.

We hope that, after hearing all of the testimony with respect to this bill, you will consider some of our suggestions here today and incorporate them where possible.

It has been a pleasure to have had this opportunity to be here today, and I would like to simply make one additional comment emphasizing California's recognition for planning. Our population today is approximately 20 million people. We are told by conservative pro-

jections that by the year 2000, which is only 30 years away, we will have a population of 38 million people.

It is obvious that we have some massive planning problems in terms of every function of life, and the ocean, since it is almost an untouched natural resource, comes at the top of my list. That is the reason I am here today. That is the reason we are all so very interested in doing an effective job to be sure that whatever the direction the Federal Government in the wisdom of this committee goes, it will be adequately coordinated with the State government.

Thank you very much.

Mr. ROGERS. Thank you very much, Governor Reinecke. Your statement is excellent. It has many, many good points, and I know this committee will want to consider placing them in the legislation. I hope also that you will make your views known to the administration directly. I think it would be most helpful to the Council, to the Vice President, and to the President, to know that California is not afraid of reorganization. I see you have done it in your own State and evidently you have done it in spite of some parochial interests of departments that we are facing here in the Federal Government.

We have had some of the departmental witnesses come up and—as is natural and I am sure you saw it when you were here—indicate they are afraid to let any constituent agency get out of their control.

I think your statement is excellent and will be most helpful to the committee.

Mr. Mosher?

Mr. MOSHER. Well, Mr. Chairman, I want to echo what you have just said. I think that Governor Reinecke's statement is certainly one of the most significant that we have had here. It sparkles with specific suggestions that are going to be very helpful and that are going to deserve our very active consideration.

I think it is especially significant because of the Governor's own background of experience on this committee, itself, which has given him perspective, because of the fact that he is the Lieutenant Governor of the largest State in the Union with tremendous problems in this area, because of his own Navy background and his experience at sea and because of his own personal career background in engineering and science and his successful experience in those areas.

All of these experiences give Mr. Reinecke a very special perspective on the problems that this committee faces on the legislation that we are considering, and therefore it is very hopeful that he endorses the bill so completely.

I join you, Mr. Chairman, in hoping that he will speak directly to the administration and seek the administration's support for the efforts that this committee is making.

Mr. ROGERS. If the gentleman would yield there.

Mr. MOSHER. I yield.

Mr. ROGERS. I would hope that when the President gets out to San Clemente that you would get him in the ocean there and talk to him and forcefully let him have your views because I think they are great, and I share Mr. Mosher's feelings.

Mr. MOSHER. Well, Mr. Chairman, there are so many useful recommendations and suggestions for strengthening the bill contained in this testimony that I am at a loss to know where to begin in trying to

discuss it or ask questions, and therefore I don't think I am going to get into specifics.

I think it is great, Ed.

Mr. REINECKE. Thank you.

Mr. KEITH. Will the gentleman yield? I ask you to do so because I have to go back to the Coast Guard Subcommittee hearing and I would simply like to echo your sentiments, and those of the acting chairman of this committee. Let me say personally, Ed, that I thought when you went back to California that you probably were going to have a more leisurely existence as Lieutenant Governor. At times I have thought of that position as an appendix to the corporate body of California, but obviously you have done a lot of homework in the job.

I think it has established quite a precedent. I hope that others of us, when we leave this committee, can carry into our later assignments the enthusiasm and the interest that you have shown.

So thanks very much for your journeying across the country to give us the benefit of your advice and counsel. It has been very nice to see you.

Mr. REINECKE. Thank you very much.

Mr. MOSHER. Mr. Chairman, let me make one more comment.

I think one of the most discerning comments that the Governor makes is on page 7 where he points to the need for growth in funding that will result from NOAA or any other reorganization we have and that the funding has to be substantially larger than merely those budgetary amounts that are represented in what the various existing offices will bring into the new agency.

Mr. REINECKE. May I respond to that.

Mr. MOSHER. Yes.

Mr. REINECKE. I would like to add that that is one of the very major points that we are concerned with also, to be sure the bill enables free and open activities on the part of the States in conjunction with the Federal program.

There is so much resource in terms of money that will be available from the private sector and from State programs providing we have some sort of an effort that allows the whole system to flow. This is why we want to see increased and enhanced activity at the Federal level, but at the same time in such a manner that will encourage the development at the State and private sector levels as well.

Mr. MOSHER. Governor, I am sure you are aware of the conference that this committee is sponsoring later this month with representatives of the various coastal States. Certainly that is going to provide a wonderful opportunity to do what you suggest on page 3, where you point to the need for an effective mechanism by which NOAA would coordinate with the coastal States in planning and activities.

I am sure that California will be well represented at that conference, and I would hope that it might be you who would be the representative.

Mr. REINECKE. I would hope so, too, and I would be delighted. The only opportunity the State has right now for Federal participation is simply through planning grants under the Department of Housing and Urban Development.

This does not seem to me to be the proper place to go for marine or ocean oriented planning or program development. This again is the reason we want to see this under NOAA.

Mr. ROGERS. Thank you.

Mr. Downing.

Mr. DOWNING. Governor, I can't begin to tell you what a genuine pleasure it is to have you back on the Hill. You were a valuable member of this committee and a valuable Member of Congress, and I value our personal friendship.

You have made a significant statement, I think one of the best we have received in these hearings. Certainly it will be studied and where possible implemented. That is all.

It is good to see you.

Mr. REINECKE. Thank you.

Mr. ROGERS. We are honored to have with us today the ranking member of our full committee, Mr. Mailliard.

Mr. Mailliard, we are pleased to have you with us, and you may want to make a comment.

Mr. MAILLIARD. Thank you, Mr. Chairman.

I want to echo what the other members of the committee have said. I am only an ex officio member of this subcommittee, and I have a great admiration for the members of this subcommittee in the way they have gone into this tremendously complicated and very important problem, and your testimony is, as everyone has said, very helpful.

I would like to ask one specific question, though. While you indicate in your statement the support of this bill, and I confess my own lack of knowledge of the detailed provisions of the bill, it seems to me that you have stressed a very important thing and that is the essential degree of coordination that is going to be required to really utilize all of the potential resources that we have to attack these problems.

Would you have the resources within the State government to make some specific amendment suggestions because I get the impression that you don't think the bill as written really does provide the degree of coordination that is desirable.

Mr. REINECKE. Well, frankly, yes, that is right. I don't feel that it goes far enough. I believe the bill should make it possible for particularly this development of the coastal zone authorities that can work with NOAA or whatever the Federal agency turns out to be.

In the case of California our new department of marine and ocean development is already funded. It is an ongoing program that has been there for years, and as such it is in the budget and will be enhanced continually as we can develop meaningful programs to go along with it, but we need this in conjunction with the funding of NOAA, the planning of NOAA, the coordination with NOAA, the granting of research and development grants through NOAA in order to make the overall program a comprehensive one, one that recognizes the national goals as well as the state goals.

Mr. MAILLIARD. We have had some experience in this committee with the difficulties of framing proper legislative language to accomplish some of these objectives, such as during the extensive hearings we had on the Motor Boat Act some years ago, trying to figure out how to get the States in their proper role and the Federal Government in its proper role. If any of your staff people or technical people have the time to help us with legislative language to accomplish these objectives, we would appreciate it.

Mr. REINECKE. Without trying to talk to the specifics, many different Federal bills, laws, require certain State planning to comply or to qualify for Federal grants, and I think this is the motivation to require States to develop their own master plans. They can come back to HUD and get the money to help them plan, but at least the plan is then launched and as soon as it is completed in a matter of 2 or 3 or 4 years, then there will be a plan effectively to begin to generate implementation at both State and Federal as well as the private sector levels.

I will look for some technical language. I don't have it right now.

(The information was not received by the time the hearing was sent to the printer.)

Mr. MAILLIARD. May I also say that I am glad you raised the point that there seems to be a desire to starve to death financially the installation at Tiburon. You mentioned that some valuable work has been going on there. I am in the process of seeing that that is not starved to extinction at least.

Mr. REINECKE. I wish you would because that laboratory serves not only California, but also Alaska. They have done some very significant practical work in the developing of manganese nodules off the shelf in Alaska so that it is not just truly State oriented.

Mr. MAILLIARD. I thank you.

I have two other committees. I will see you later in the day.

Mr. REINECKE. Thank you.

Mr. ROGERS. Mr. Leggett.

Mr. LEGGETT. Thank you, Mr. Chairman.

I am pleased to see that we have this totally bipartisan approach to oceanography in California. It doesn't surprise me to see you come here and give this bipartisan contribution. The recommendations that you have expressed in a constructive way as to the bill before us is in a way the other side of the compromises that were made in order to get the current bill before this House.

You point up the Nation and the sea in your testimony. I am sure you are familiar with that, and of course that points out all of the things that you have alluded to, recreation which is not in this bill, the water pollution which is not in this bill, the navigation from the Corps of Engineers which is not in this bill, and of course, ad infinitum.

The point is that we are left in the bill then with four agencies, the Coast Guard which doesn't really have as a primary objective the exploration of the ocean bottom, the environment weather bureau which really has the air, I guess, as its primary element of review; then we have the Great Lakes Agency which is part of the Corps of Engineers which is rather geographically limited, and then we have the Bureau of Sport Fisheries from the Department of the Interior.

I think those are the four agencies that are merged in this bill. We don't include Commercial Fisheries from the Department of the Interior, and of course what we end up with is the budgets from these agencies which is about \$200 million, and I know a lot of us that have frolicked in the idea of a new oceanographic agency who have thought of \$1 billion or \$2 billion magnitude.

I share your views, and I hope that we can get into fundamental ocean discovery and not limit ourselves to what we have done in the past, but really take on a new scope and have all of these agencies jell

together and build some enthusiasm and programs which can interrelate with the great States of California and North Carolina that want to do things in ocean development and discovery.

Mr. REINEKE. I might say, Congressman Leggett, that we recognize the difference between the bill before us and the bills that were presented earlier this year. Rather than trying to capture totally all of the agencies that you mention that are not included in the present bill, in this testimony we are recommending a liaison preferably, even of a contract type, to be sure that it is there, but a strong liaison between these other departments and agencies that were not specifically included in the present bill.

But I feel it is very essential that all of those agencies be well represented and well tied-in by whatever means and if the political practicality is such that we just can't do it at this time, then at least we should have a contractual relationship that will guarantee the services and the advice and technology that is known by these other agencies and by that I think we can then accomplish the objective that we are really looking for.

Mr. LEGGETT. I think your testimony is outstanding. Rather than just coming before the committee rubberstamping what we have laid down as a kind of a pilot bill, you have given us some constructive thoughts, and I think it is going to be very helpful. Thank you very much.

Mr. ROGERS. I share those thoughts, and I think it might be interesting to note that I know Chairman Lennon has two drafts of proposals for coastal zone operation that can be incorporated in the bill. I do, and I am sure other members know that too well. I think the points you have made are excellent.

Mr. Dellenback.

Mr. DELLENBACK. Thank you, Mr. Chairman.

I intended, Governor, not to join in the love feast and to say something irreverent, but I suppose it would break the mood of the morning. On the bipartisan basis I will resist my temptation.

Your contribution was material to the House when you were a member and not only to this committee but to the subcommittee. I think that that which was probably a sound decision from a standpoint of the people of California and your own personal standpoint, to leave this body and take your present position, was one that some of us from a selfish standpoint regreted because California's gain was our loss.

Relative to your testimony this morning, do I find running through it the clear feeling that here is a great challenge which faces us which is not being met by present practice?

Mr. REINECKE. Very definitely. No question about that.

Mr. DELLENBACK. This is clearly what I culled from the testimony, and I wanted to make this point clear because some of the witnesses who have appeared before us have talked in terms of what appears to me to be facelifting of the present situation.

They sort of say, "Well, we are getting along pretty well. We are doing these things now." And I read your testimony as—without being unduly critical of any specific agency at the present time—saying that the massive challenge which we face is just not being met adequately by that which is being done at the present time. This is correct, is it?

Mr. REINECKE. Yes, it certainly is.

Mr. DOLLENBACK. I think we tend sometimes to reach for analogies that hold up only partly. I think one of the analogies that we face, those of us who are concerned about the ocean and the atmosphere, is that we think in terms of the space effort. I think there are strong similarities and you point out some of them in your testimony about the need for a clear Federal pattern and a clear involvement of the Federal and the State and this point to which allusion has been made earlier about the vital imperative of major increases in funding.

I think you have done another thing that needs to be done in this in your testimony when you do point out the dissimilarities.

You, on page 8, make clear that, in your words, "Ocean effort is not truly to be compared with that of space."

I don't see what we are doing here or what we are proposing to have done in this bill as being a mirror of what has happened in the space effort at all because that can be coordinated in a way that this cannot be.

Do I read you correctly again that, while tracing the analogy to a certain point on such things as the need for a massive infusion of funding, for a clear coordination of effort, a clear blending of the Federal effort with the State effort, you also are soundly pointing out some of the points of distinction which have to be different between the ocean and atmosphere?

Mr. REINECKE. There is no question about that. We have a whole different set of circumstances, particularly the fact that the States will each individually be involved as opposed to the space effort which was primarily almost a single agency type of constructive effort.

That is why we need to establish not only additional funding and recognizing the limitations that we are all facing on funding do the best we can, but certainly let's establish the organization that will allow for this funding to increase as these plans develop and as the future becomes more important to us in the oceans.

So it is the funding and the organization, the legal aspects that we are so very interested in.

Mr. DELLENBACK. We appreciate this. I join with my colleague Mr. Mosher in hoping that, as we move forward with this conference later this month that chairman Lennon has called for, California will be well represented and, if it so works into your duties, that you can be back. I am sure there is nobody or very few in the State of California that can bring a sounder approach to this and give us of your own background.

Thank you so much for coming.

Mr. REINECKE. Thank you.

Mr. LEGGETT (presiding). Thank you very much, Mr. Dellenback.

Did you say in your testimony, Governor, the monetary expenditure that California has currently involved in this program?

Mr. REINECKE. I am afraid I don't have the total program. We are spending \$170,000 on the planning phase. We are spending another \$55,000 on the funding of the California Marine Advisory Commission.

In addition to that there are many agencies that have ocean oriented programs such as fish and game, such as our water pollution, such as our Department of Water Resources. There are numerous agencies

that have marine oriented programs. I do not have the total budget as broken down to specifically marine orientation.

I will be glad to get that figure for the committee if you would like. (The information was not received by the time the hearing was sent to the printer.)

Mr. LEGGETT. Do you think this would be a proper area for returning funds to the State?

Mr. REINECKE. It certainly sounds good to me. I can think of no better application or area of greater interest on my part.

Mr. LEGGETT. The gentleman from Ohio, Mr. Feighan.

Mr. FEIGHAN. Thank you, Mr. Chairman.

Governor, I just wanted to say that your exceptional testimony re-emphasizes my firm belief that the House of Representatives' loss was California's gain. I am very happy that you are here with us today.

I was very much impressed by your comprehensive recommendations, and I just hope that you will have time this afternoon to visit the floor and see members on both sides of the aisle, all of whom have a high regard for your ability and friendship.

Mr. REINECKE. Thank you very much, Mike.

Mr. LEGGETT. Thank you very much.

Mr. Ruppe from Michigan.

Mr. RUPPE. Thank you very much, Mr. Chairman.

I am certainly glad that the Lieutenant Governor of California is here and that, after making such a fine contribution in the House, he leads the same fight for a stronger oceanographic program in the State of California.

I might ask in view of the specific references and program suggestions you have made for this legislation, is it your intention or has the State of California gone forward with a program encompassing the same elements as you suggested for us here today?

Mr. REINECKE. Very much so, yes. California has the Marine Advisory Commission which advised and oversees from the private sector and the legislative point of view all of the planning that is done. Legislatively we now have passed a bill which has made law the Interagency Council which is now doing the planning and which subsequently then will develop this plan and turn it over to our new Department of Navigation and Ocean Development.

This new department is the real crux, the real thrust of the future as far as California is concerned. This department will be our CZA, and we will have that department in operation whether the Federal Government does it or not because that is the way we are going to have our State organized. It is done. It is not in effect. It is an accomplished fact.

What California is now waiting for is recognition of this concept of ocean development by the Federal Government so that we can move together to accomplish national goals with a little of your money.

Mr. RUPPE. So this State agency will have the responsibility and the direction of creating programs, and coordinating the various State responsibilities.

Mr. REINECKE. Yes, indeed, with all of the overlapping and interfacing of jurisdictions of estuarine control, of pollution, of marine development whether it is pure science, whether it is applied tech-

nology, whether it is gas and oil development, powerplant siting, sewage effluent problems, anything of this nature this one department now has the entire responsibility for the development and the coordination and the compliance with these plans.

Mr. RUPPE. Do you, on a State level feel that you will be in a much better position to fund this agency at a higher level than you would the piecemeal groups involved in this direction?

Mr. REINECKE. There is no question about it. This has been developed. Through the reorganization plan the legislature had the opportunity to look at this and to turn it down if they wanted to.

They recognized the wisdom and, gratefully, they passed the bill so that we do have this in effect at this time.

Mr. RUPPE. Thank you.

Mr. Chairman, I would say that if we could pass legislation like this, there would be bipartisan support for the multimillion dollar programs suggested by the committee.

Mr. LEGGETT. I am glad that something unlocks your liberalism.

I recognize the gentleman from Alaska now.

Mr. POLLOCK. Thank you, Mr. Chairman.

Ed, we are all delighted to see you back here visiting. It seems very interesting for me, having spent so much time with you on the committee, to read your presentation. I think it is excellent. I am sure you did touch on this, but I came in late and I am not sure I understand the relationship of the Interagency Council for Ocean Resources, ICOR, which I presume is a State agency——

Mr. REINECKE. Yes, sir.

Mr. POLLOCK. And your Department and your California Advisory Commission on Marine and Coastal Resources. Are they in conflict in any way?

Mr. REINECKE. No, they work very much together. The ICOR is strictly a high-level, such as the National Council on Oceanography. It is made up of the five Cabinet Secretaries and myself. As such it is an in-house executive operation whose function is totally planning. At such times as the California Ocean Area Plan is developed, ICOR will cease to exist, and we will turn the product of that over to the new Department which is then a departmental operation for implementation of navigation and ocean development.

But CMC, the Marine Advisory Commission, is principally a review body, private sector primarily, with some legislative input as well.

Mr. POLLOCK. An advisory commission?

Mr. REINECKE. Advisory to the legislature and to the Governor.

Mr. POLLOCK. And will they be advisory also to the Department?

Mr. REINECKE. Yes. Any agency that would be advisory to the Governor would be passed on to the appropriate department.

Mr. POLLOCK. Did I understand your response to Congressman Mailiard to be that you could come up with specific recommendations for amendments to the bill?

Mr. REINECKE. I think we could, yes. We would be glad to.

Mr. POLLOCK. That would be very helpful.

Mr. REINECKE. I didn't want to assume the prerogative of the committee and establish specific language.

Mr. POLLOCK. I understand that, but I think from your point of view, representing a State and being very much involved in its per-

sonally, and with your background and knowledge of both the committee's responsibilities and those of your own State, it could be most helpful.

You have obviously taken quite a lead in California over the other States in the development of a system or organization for utilizing the resources of the sea.

Mr. REINECKE. We feel we have moved ahead very fell. We are going to move ahead. We are moving now and we would just like a lot of company.

Mr. POLLOCK. I am delighted with a lot that you had to say and would like to tell you that if I again address the Alaska Legislature early in the year, as I have done each year since I have been in Congress, I will certainly bring out for consideration some of your California activities in this area.

It is nice to have you here, Ed.

Mr. REINECKE. Thank you.

Mr. LEGGETT. Thank you very much, Mr. Pollock.

Now Florida would like to cross-examine California. Mr. Frey.

Mr. FREY. It is a pleasure. I would like to welcome you.

There is very little to add, but I would like to join my colleagues.

Running through this testimony there is, it seems to me, a recognition by you that certainly the present bill is much too narrow. Is this true?

Mr. REINECKE. I am not sure that narrow is the word.

Mr. FREY. Limited in scope.

Mr. REINECKE. It is limited, yes. It appeared to me to be a reaction perhaps to testimony from the bills introduced earlier this year that were too broad. So some of the proposals were withdrawn probably for good and practical political reasons. I am trying to extend the dimension of the bill out somewhat now even if only by contractual relationships to these other agencies.

I do feel that it is necessary to establish this total concept at this time because I doubt very much that we are going to make significant organizational amendments to it for some time to come after the bill is passed.

Mr. FREY. From what you said previously, I understand that when you faced this situation in California in essence trying to establish a department that would be involved with oceanography, you went ahead and did it as an independent department or agency.

Mr. REINECKE. That is correct.

Mr. FREY. On page 11 you sort of leave up in the air your personal preference or the State's personal preference regarding this bill. I wonder.

You said, " * * * independent agency directly to the President or to a Cabinet Secretary, or finally to a Council * * * "

Do you have a preference personally?

Mr. REINECKE. I would like to see this an independent agency but also, having served time on this and other committees, I recognize the practical problems, and I felt that you gentlemen not only on this side of the Capitol, but those on the other side of the Capitol would probably have something to say.

Mr. FREY. You have made this concept work in California by setting up a department?

Mr. REINECKE. We have set up a separate department within the Resources Agency. We have a little different structure in California. We have a Natural Resources Agency that encompasses everything concerning the natural resources of the State.

Mr. FREY. This was the one further question I was going to ask in talking about the scope of this. Throughout your remarks ran the problem, which really exists, of coordination which so many other bureaus and departments. I was a little bit surprised when you were answering Congressman Pollock on this.

I thought for a minute that your agencies were two levels within a coordinating agency which you are going to keep, composed of you and the various secretaries that you are going to keep for coordination, but you are going to do away with that?

Mr. REINECKE. That is right. This will be a departmental function. It will, however, be counseled or advised by this private sector and legislative group known as the Marine Commission.

Mr. FREY. I just was thinking out loud from that idea as to the problem of coordination. Do you think that there would be any merit at all in what we are doing to have a two-step affair, for instance, a council on environment for the planning stage which could be composed of the various under secretaries and then an action agency as far as this agency goes?

Mr. REINECKE. I look at it this way. We have studied this problem for a long time. Our Nation and the sea report is a prime example of how this investigation was done. I think we are far enough along now that it is necessary for the Federal Government to make specific organizational changes to facilitate the planning at lower levels of Government, namely, State and perhaps some county, and for that reason I would like not to see this go into a planning stage again but to develop specific organizational form.

Mr. FREY. I didn't mean in a planning stage. What I meant is the problem, once we get this going, of coordination, for instance the problem with the Bureau of Mines and with them Bureau of Roads.

Mr. REINECKE. This will be more of a problem at the Federal level than in California because we have simply transferred those functions to the Resource Department under this new Department of Navigation and Ocean Development.

There are very few conflicting agencies or departments now that are not already incorporated into this one heading which is under the Secretary of Resources so that we have done it all at once.

Mr. FREY. Thank you.

I see the chairman walked in so I will yield back the balance of the time.

Mr. LEGGETT. I want to thank you very much, Governor, for your outstanding presentation here this morning.

We have the chairman of our subcommittee back who has pioneered the current bill before the committee. I might state parenthetically in those synopses of comments on the Governor's testimony that he has done a very good job of pointing up some of the things that we would have liked to have had in our bill but we kept out because we felt that there might be further conflagration by trying to put them in.

I think he has made some very constructive recommendations which I know are appreciated by the members of the committee who are here.

Mr. LENNON (presiding). Thank you, sir.

I want to welcome any personal, good friend and a friend of this program and tell him how much we have missed him since he has been at home, so to speak, in his new capacity as Lieutenant Governor of California.

We are delighted, Governor, that the State of California has taken this initiative. I won't say they took it first because we did have the Governor of North Carolina here some several weeks ago, who addressed himself to many of the things that you have. I did have the opportunity last evening to read your statement, and I am sure you understand why I wasn't here this morning to extend a personal as well as official welcome to you. We certainly intend to keep in touch with those representatives of the coastal States and the lake States who have a vital concern and interest in this matter, and we know that the State of California or at least we have been advised that the State of California will participate in the forum that we intend to conduct here on October the 28th and 29th, this month, related primarily to some of the things that you have stressed: coastal zone management and the laboratory system which has been suggested.

I might say to you that we need your counsel and advice and active support in persuading the administration to move forward in this direction.

We can certainly understand that being called upon in January of this year or certainly last November, to make a definitive judgment with respect to the Commission's report, that they have been delayed looking at the total picture of Government reorganization.

But we believe and I think you know, Governor, that this legislation, as the gentleman from California, Mr. Leggett, has just commented, that we have reached a consensus with respect to two specific recommendations of the Commission concerning a Government structure, NOAA, and also the National Advisory Committee.

We did not hope to obtain a consensus with respect to the other aspects of the Commission's report at the time we introduced this bill.

Now, subsequent to that time there has been a bill introduced that is headed in the direction of trying to implement the Commission's suggestions or recommendations with regard to the coastal zones.

Now, the recommendations are not very definitive in the Commission's report with respect to that. That is the reason we thought it appropriate to bring to Washington representatives of the some 30 States who have a vital interest in this program and who would help us arrive at some sort of a conclusion as to the direction we should go related to the areas that they are particularly interested in, every coastal State and of course every Great Lakes State having a vital interest in this commission report.

I might say to you that early this year we started the hearings and, as a former member of this subcommittee, you will be interested in and perhaps already know that we found on the part of industry and on the part of the university level and private laboratory level an almost complete agreement with respect to the complete implementation of the Stratton report as you know it so well.

With respect to the Government structure, naturally we found as we expected to find, some hesitancy to move along in this direction. We found on the other hand that this Commission's report has done a great deal to stimulate the various agencies, especially the Department of the Interior and even the Department of Commerce and Department of Transportation, to try to enlarge their scope of participation in the marine sciences.

They all now seem to indicate to us that they have the capability in their respective departments to take over the suggested tasks laid down to us by the Commission.

We expected that. As a matter of fact, I think some of them moved in this direction before the report came out. I saw signs of it.

As you know, the Commission included a Government representative at the Secretary level or at least assistant secretary of the Navy, Assistant Secretary of the Department of the Interior, and of course Dr. White who is the Administrator of the Environmental Science Services Administration in the Department of Commerce.

We noted that quite early this year before the Commission report came out that there was a movement in the Department of the Interior in this direction. We commend them for it and question why they have not done it before.

So that with your influence that you have with the present administration, we hope that we can get from the administration some definite recommendations that will at least put us in a position that we won't have a fight on the floor when we hopefully bring this bill to the floor before the conclusion of the first session of the 91st Congress.

I know you are interested in it. In my judgment there has never been a more sincere man than you, I say as a dear friend, who worked harder as a Member of Congress and of this committee.

I do know you are doing a good job out in California, and we are very happy to have you here as a witness.

Mr. REINECKE. Thank you very much, Mr. Chairman.

I can assure you that I will make these views known to the administration.

Again, frankly, I had not done so until I had first exposed them here to this committee, but I shall do so.

Mr. LENNON. I think the gentleman knows that the bill was introduced simply as a vehicle, as a feeler, and was sent out, and every member of this subcommittee on both sides of the aisle is a cosponsor of that legislation. We are proud of the fact that this committee has always been one that was not interested in anything other than that we hoped to do what was in the national interest without regard to any partisan politics at all. This is an area in which we shouldn't have partisan politics in my judgment.

Mr. REINECKE. I certainly have admired the work and inspiration which you have provided for this committee, Mr. Chairman. I certainly want to work with you now as I did several years ago.

Mr. LENNON. Thank you very much, Governor, for your appearance.

Mr. REINECKE. Thank you

Mr. LENNON. Now we are delighted to have with us Dr. T. S. Austin, the director of the National Oceanographic Data Center.

Doctor, we are honored to have you here today because of your long interest and participation in the field in which we have a common interest.

You go right ahead, sir, with your statement. We are delighted and honored to have you.

(Dr. Austin's biographical sketch follows:)

CURRICULUM VITAE OF THOMAS S. AUSTIN

Education:

BA Biology, 1938, Grove City College.
MA Zoology, 1940, University of Buffalo.
MS Limnology, 1942, Yale University.
DSc (Hon.), 1965, Grove City College.

Experience:

2 years—Instructor, Naval Training School, Grove City College.
3 years—Oceanographer, Woods Hole Oceanographic Institution.
6 years—Oceanographer, Naval Oceanographic Office.
9 years—Oceanographer, Bureau of Commercial Fisheries (BCF) Laboratory, Honolulu.
3 years—Assistant Director, BCF Laboratory, Honolulu.
2 years—Assistant Director, BCF Laboratory, Washington, D.C.
2 years—Director, BCF Laboratory, Washington, D.C.
3 years—Director, BCF Laboratory, Miami.
Present—Director, National Oceanographic Data Center and World Data Center A for Oceanography.

Publications: 36.

Scientific Organizations:

The Society of the Sigma Xi.
American Meteorological Society (Associate Member).
New York Academy of Sciences.
Marine Technology Society (Charter Member).
American Society of Limnology and Oceanography.
American Society for Oceanography (Charter Member).
Gulf and Caribbean Fisheries Institute.
American Geophysical Union.

Special Assignments Include:

International Coordinator, Intergovernment Oceanographic Commission, International Cooperative Investigations of the Tropical Atlantic, 1962-.
Deputy Chairman, Panel on International Programs and International Cooperative Organizations, 1967-.
Chairman, Intergovernmental Oceanographic Commission, Working Group on International Oceanographic Data Exchange, June 1968-.
Member, National Council on Marine Resources and Engineering Development, Committee on Ocean Exploration and Environmental Services, August 1968-.
Participant, Steering Committee Workshop on International Decade of Ocean Exploration, Woods Hole, Massachusetts, September 3-13, 1968.
Chairman, Editorial Committee for the Cooperative Investigations of the Caribbean and Adjacent Regions, January 1969-.

STATEMENT OF DR. THOMAS S. AUSTIN, DIRECTOR, NATIONAL OCEANOGRAPHIC DATA CENTER

Dr. AUSTIN. Thank you, sir.

I am especially honored to be here this morning and hear the statement from the Lieutenant Governor of California. When those of us in marine sciences think of California, we think of the Scripps Institution of Oceanography in California, the State fish and game department, and the other organizations in the State from whom the National Oceanographic Data Center receives significant contributions of high quality, and to whom we respond to requests.

I appreciate the opportunity of appearing here this morning to discuss the role of the National Oceanographic Data Center and to express some of my personal views in the light of the recommendations of the Commission report and H.R. 13247.

As this is the first time I have had the pleasure of appearing here, sir, I have provided the chairman and each of the members of the committee with a résumé of my education and experience. I shall not comment on that.

MR. LENNON. Without objection it will be inserted in the record immediately preceding the doctor's statement.

DR. AUSTIN. I have also furnished each of you with a copy of last year's annual report of the National Oceanographic Data Center called Highlights and a little brochure that describes the activities of the Center. I believe each of you has a copy of my statement that I would appreciate having in the record, and I will speak from it only.

MR. LENNON. All right, sir. Without objection the full text of your statement will follow your comments.

DR. AUSTIN. Thank you, Mr. Chairman. I will keep it brief. I noticed you looking at your watch earlier.

MR. LENNON. That is all right. Go ahead, sir.

DR. AUSTIN. The National Oceanographic Data Center was established by an interagency agreement in December 1960. The Center's basic mission is to receive, compile, to process, to preserve, and disseminate the oceanographic data it receives.

As a personal aside, I consider the data as a national resource. I consider the problems of compilation processing, and archiving of oceanographic data are extremely important since they range the full gamut of the marine sciences.

Like some other data perhaps, oceanographic data do not grow old. The oceanographers, the people concerned with the fisheries and industry are interested in the compilation of the data over decades. They are interested in the changes that are going on in the oceans with time, as these changes may influence the distribution and abundance of the fisheries, the global weather, and so forth.

The operations of the Center are funded by reimbursements from 10 agencies participating in the support of the Center. The management and partial financial support of the Center are furnished by the Naval Oceanographic Office as amplified by the policies and procedures established by the Advisory Board.

The Advisory Board was established to provide an effective means of formulating, expressing, and transmitting the joint policy and technical direction of the Center.

The Board consists of representatives of the sponsoring agencies. These agencies now are the Navy, the NSF, the BCF, the AEC, the Coast Guard, the Coastal Engineering Research Center, Geological Survey, the HEW, the ESSA, and the FWPCA.

In addition, two nonvoting members are appointed by the National Academy of Sciences and are always scientists in their own right, and three observers, one from industry, one from the National Council, and one from the new National Oceanographic Instrumentation Center.

Each of the supporting activities provides a pro rata share of the estimated costs for the operation of the Center, the acquiring, the compiling and the preservation of the oceanographic data.

A summary of the funds available is shown in table 1.

It should be noted that the funds are for the operation of the Center. The contributing agencies like other users are charged. This type of funding has not resulted in any severe limitations on the operation of the Center, but it is a clumsy method, and it is awfully difficult to plan ahead in that we never are sure of the level of the funding.

The agencies have not always found it possible to contribute at the level the Advisory Board recommends. A single agency line item funding has been suggested.

During the 86th Congress bills were introduced that would have included in the NODC certain types of marine environmental data which we do not now store, specifically the fisheries, the hydrographic, the bathymetric, meteorological, coastal, and certain kinds of geophysical data.

In keeping with the mission-oriented aspects, however, other agencies have been designated as repositories of these types of data: The Naval Oceanographic Office and the Coast Geodetic Survey, the bathymetric; the Weather Bureau, the meteorological and climatological records; and the Bureau of Commercial Fisheries, the fishery statistics. The geophysical data now reside in several agencies.

The Commission did not undertake a detailed proposal for the national marine data service activities. It deferred to the ongoing study funded by the Council to the System Development Corp.

Unfortunately this study is not complete. However, within the framework of the present hearings, I would like to comment on some aspects of marine data management.

I would like to emphasize that the views are essentially my own. Quite possibly program managers and representatives of agencies performing missions that generate or require the marine data will have different views.

The oceans are a potential source of protein and mineral resources. Our knowledge and experience dictate that these resources are not unlimited and that we should develop sound management policies.

This requires the use of existing data and information and requires adequate planning for the continued generation and analysis of such data.

Although oceanography is a relatively new science, man is becoming increasingly aware of the necessity to consider the oceans, or segments of the oceans in their totality.

Discovery, assessment, harvest, and the management of the fisheries; for instance, demand knowledge of the physics, the chemistry, the geology, and the biology of the marine environment.

The petroleum industry requires the geological, the geophysical, and the biological data from the surface and the deep sediments on the ocean floor and information concerning the physical, the chemical, and the biological properties of the water column above these sediments.

These are but two examples of the users that would benefit from having one marine data center from whom the data could be obtained.

The problems now resulting from the storage of the marine environmental data in more than one center have been cogently expressed by Dr. White, administrator of ESSA, in an article that he recently published and I quote in part:

There is no single focus for geomagnetic, gravity, bathymetric, or other ocean survey data.

Not only is there no one place to go to obtain marine data, there is not even one mechanism which will tell you what exists. But more important is the problem of collating the information. In too many areas—of which air-sea interaction is an outstanding example—scientists and engineers must deal with simultaneously processed data from different environments, with computers which are in separate centers, with differing formats, programs, procedures and goals.

As I previously mentioned, the data from many marine disciplines are not stored in the National Oceanographic Data Center. Part of this is due to restrictions of our charter which prohibits the duplication of the functions of other official repositories such as the Weather Bureau; the Coast and Geodetic Survey, the Naval Oceanographic Office, and so forth.

The National Oceanographic Data Center does interact with each of these activities to obtain the data for the customers.

Separate storage can be troublesome to the users; for instance, if you wish to correlate the sediment transport with the subsurface currents or to establish the relationship between the climatological events and the wind driven currents.

In the first instance the user would have to go to three sources, the Coast and Geodetic Survey, the Naval Oceanographic Office, and the National Oceanographic Data Center.

For the second, the NWRC and the National Oceanographic Data Center.

Further, these data are all too frequently not processed in the same manner and could be in incompatible formats.

I propose that a solution to these types of problems would be to establish two data centers in a single agency, one for meteorological and climatological, and the other for all other types of marine data.

Compatibility among the data bases would be nominally assured. The administrative costs would be considerably reduced. I think within the state of the art and the computer technology either of the data bases could be rapidly accessed.

The Commission stated: " * * * the already overloaded general-purpose data centers should avoid involvement to the extent possible in any aspect of the data problem which might have logical affiliation with existing mission agencies."

I do not agree with this conclusion.

I believe that a general purpose marine data center—a concept endorsed by our advisory board—would not detract from the missions of the agencies or organizational components of a NOAA. I believe that the center would be of value for a number of efforts, for instance, the Navy.

For example, bathymetric data, once they were used to produce and update navigational charts, could be accessioned by the marine data center and be available for all other uses. Certain fisheries statistics that are environmentally related—for example, catch per unit of effort as opposed to total landings—and which are Bureau of Commercial Fisheries mission oriented could be included.

Gravity and magnetic data after the preparation of the charts and reports could repose in the center.

Some data could and should be excluded; for example, certain of the research data that have a one-time application. However, these

data should be carefully inventoried, in case any other scientist is interested.

The classified probably would also be excluded, but close liaison should be maintained to insure compatibility. I do not believe that the data should be acquired in realtime by the proposed center. Again, the realtime utilization is a mission oriented aspect for the development and promulgation of forecasts.

However, after the data are used in the preparation of the forecasts, they are of climatological interest, historical interest, and should go to the national center.

We now exchange the classical types of oceanographic data directly with the foreign national and regional centers through the mechanism of World Data Center-A, Oceanography, which is collocated with the National Oceanographic Center. I believe that this exchange on the international level would be facilitated if there were a single national center holding the data for all the marine disciplines.

The procurement of the data from foreign nations yields high returns with a low investment. As an example, more than three-quarters of the data in our station data file, consisting of over 300,000 stations, contains foreign data that our scientists, our Federal activities, and our industry use over and over.

I believe that a national marine data center should continue the concept of an interagency advisory board. Such a board provides the mechanism for the responsiveness to all segments of the user community-government agencies, the academic and private research institutions and industry.

As I indicated, the Commission recommended that there be more than one data center. To quote again: "The great variety in quantity, quality, and uses of these data suggests that total environmental data cannot be handled readily by a single center."

I believe that with advances in computer and communications technology, a monolithic national environmental data center seems inevitable, but it should be approached cautiously and within the framework of a phased development. The merging of data functions at too early a stage could generate adverse impacts on a data system for the marine sciences.

I believe in summary, Mr. Chairman, that whatever the future Federal framework for oceanography, the following proposals should be considered with respect to the management of marine data:

1. Data management functions be merged to create a single identifiable national marine data center.
2. Data generated as part of mission oriented activities, especially geophysical data, be transferred to the national marine data center once they have served their primary use.
3. The national marine data center would coordinate closely with the national weather data center to achieve compatibility.
4. The concept of an interagency advisory board, functioning essentially as a board of directors reviewing budget, policy, and progress, should be continued.
5. Finally, from my viewpoint and experiences as Director of NODC, I believe that funds should be provided to the National Marine Data Center from a single agency.

That completes my statement, sir. I should be happy to answer questions.

(Dr. Austin's complete statement follows:)

STATEMENT OF THOMAS S. AUSTIN, DIRECTOR, NATIONAL OCEANOGRAPHIC
DATA CENTER

Mr. Chairman, gentlemen, I appreciate the opportunity of appearing before you today to discuss the National Oceanographic Data Center (NODC) and some of my personal views in light of the recommendations of the Commission on Marine Science, Engineering and Resources and H.R. 13247.

The NODC was established by an interagency agreement on December 23, 1960. The Center's basic mission is to receive, compile, process, preserve and disseminate appropriate oceanographic data submitted to it.

The Center's operations are funded by reimbursements from participating agencies. Management and partial financial support of the NODC are furnished by the Naval Oceanographic Office as amplified by the policies and procedures established by the National Oceanographic Data Center Interagency Advisory Board.

The Interagency Advisory Board was established to provide an effective means of formulating, expressing and transmitting joint policy and technical direction to the Center. The Board consists of representatives of the sponsoring agencies. These agencies are: Navy, National Science Foundation, Bureau of Commercial Fisheries, Atomic Energy Commission, Coast Guard, Coastal Engineering Research Center, Geological Survey, Health, Education and Welfare, Environmental Science Services Administration, and the Federal Water Pollution Control Administration. In addition there are two non-voting members appointed by the National Academy of Sciences and three observers, one from industry, one from the National Council on Marine Resources and Engineering Development, and one from the National Oceanographic Instrumentation Center.

As provided for in the charter, each supporting activity provides a *pro rata* share of the estimated cost for acquiring, compiling, and preserving oceanographic data by the Center. An amendment of the *pro rata* shares was made to the NODC charter in FY 1964; the *pro rata* shares are now reviewed annually. A summary of funds available to NODC for FY's 1968-70 is shown in Table 1.

It should be noted that the funds provided are for the operation of the Center; the contributing agencies, like other users, are provided services at cost.

Although no disastrous limitations in funding have occurred, I feel that the current method of budgeting is clumsy and has negated efficient planning. Agencies have not always found it possible to contribute to the Center at the level recommended by the Advisory Board. Single-agency, line-item funding has been suggested.

During the 86th Congress, bills calling for the establishment of a National Oceanographic Data Center were introduced in the Senate (S. 2692) and in the House of Representatives (H.R. 12018). These bills would have included in NODC certain types of marine environmental data that we do not store: specifically: fisheries, hydrographic and coastal survey, meteorological, and geophysical data. But in keeping with their missions other agencies have been designated as repositories for these data. The Naval Oceanographic Office and the Coast and Geodetic Survey retain hydrographic (bathymetric) data; the Weather Bureau, meteorological and climatological records; and the Bureau of Commercial Fisheries, fisheries statistics. Geophysical data reside in several agencies.

The Commission has not undertaken to prepare a detailed proposal for national marine data service activities. Instead it deferred to a study by the System Development Corporation. Unfortunately, this study is not yet completed. However, in the framework of the present hearings I would like to comment on some of the aspects of marine data management. I should emphasize that the views I am about to express are substantially my own, tempered by years of involvement in marine sciences. Quite possibly, program managers and representatives of agencies performing missions that generate or require marine data will have different views.

The oceans are a potential source of protein and mineral resources. Knowledge and experience dictate that these resources are not unlimited and that sound management policies should be developed. This requires the use of existing data and information and adequate planning for the continued generation and analyses of such data.

Although oceanography is a relatively new science, man is becoming increasingly aware of the necessity to consider the oceans, or segments thereof, in their total-

ity. Discovery, assessment, harvest, and management of fishes require knowledge of the physics, chemistry, geology, and biology of the marine environment. The petroleum industry requires geological, geophysical, and biological data from the surface and deep sediments on the ocean floor and information concerning the physical, chemical, and biological properties of the water column above these sediments. These are but two examples of users that could benefit from having one marine data center to query for data.

Problems resulting from storage of environmental data in more than one center have been cogently expressed by Robert M. White, Administrator of the Environmental Science Services Administration (ESSA) in an article in "Computers and Automation" (April 1969) :

"Data from the ocean's surface up—sea surface temperature, waves, swell, and the physical measurement of the atmosphere above the sea—are handled by ESSA's National Weather Records Center in Asheville, N.C. Our organization has also begun a very limited service concentrating on magnetic, gravity, seismic reflection, and bathymetric data, but this involves mainly ESSA-generated observations. There is no single focus for geomagnetic, gravity, bathymetric, or other ocean survey data.

"Not only is there no one place to go to obtain marine data, there is not even one mechanism which will tell you what exists. But more important is the problem of collating the information. In too many areas—of which air-sea interaction is an outstanding example—scientists and engineers must deal with simultaneously processed data from different environments, with computers which are in separate centers, with differing formats, programs, procedures, and goals. The ultimate consequences of this situation are apparent."

As I previously mentioned the data from many marine disciplines are not stored by NODC. Part of this is due to restrictions of the charter which prohibit duplication of the functions of other official repositories, such as the Weather Bureau, the Coast and Geodetic Survey, the Naval Oceanographic Office, the Smithsonian Institution, and similar agencies. The NODC does interact with these centers to obtain data for consumers or for purposes of referral. From the viewpoint of a data center manager, this is inefficient.

Separate storage can be troublesome to some users; for example to someone who wishes to correlate sediment transport and sub-surface currents or those who wish to establish the relationship between climatological events and wind driven currents. In the first instance he (or the NODC) would probably have to use at least three sources: The Coast and Geodetic Survey, the Naval Oceanographic Office, and the NODC; in the second: The National Weather Records Center (NWRC) and the NODC. Further, these data are all too frequently not processed similarly and thus may be in incompatible formats.

I propose that a solution to these types of problems would be to establish two data centers in a single agency, one for meteorological and climatological data and the other for all other marine data. Compatibility between data bases would be more likely. Administrative costs would be considerably reduced within the state of the art in computer technology, either of the data bases could be rapidly accessed through remote terminals by the other or for that matter by remote terminals located practically any place in the Nation.

The Commission stated "* * * the already overloaded general-purpose data centers should avoid involvement to the extent possible in any aspect of the data problem which might have logical affiliation with existing mission agencies." I do not agree with this conclusion. I believe that a general purpose marine data center (a concept endorsed by our Advisory Board) would not detract from the missions of present agencies or organizational components of a NOAA. Instead, I believe such a center would be of value for important National efforts, such as the Navy. For example, bathymetric data, once they were used to produce and update navigational charts, could be accessioned by the marine data center and therefore be more readily available for other uses. Certain fisheries statistics that are environmentally related (e.g., catch per unit of effort as opposed to total landings) and which are Bureau of Commercial Fisheries mission oriented could be included. Gravity and magnetic data pertaining to marine areas could also be in the center.

However, some data could be excluded; for example, certain esoteric data having a one-time use in research projects, purely experimental data, or data unique to one or a few scientists and of limited use to others. Such data, however, should be inventoried, primarily for referral purposes. Classified data would also be excluded; however, close liaison should be maintained with the gatherers

and holders of classified data to ensure compatibility with the holdings of the National center. Even at present, there may be a serious problem from the standpoint of merging classified with nonclassified data in times of a National emergency.

I do not believe that data should be acquired in realtime by the proposed national marine data center. Such data should flow to the center after the primary use; namely, forecasting had been satisfied. Ultimately it may prove desirable to merge realtime and historical centers. In the meantime, however, the activities of both should be closely coordinated, possibly by being structured within the same agency.

We now exchange the classical types of oceanographic data directly with foreign national and regional centers and through the mechanism of World Data Center-A, Oceanography which is collocated with NODC. I believe that exchange of data on the international level would be further facilitated if there were a single center for all marine data disciplines. Procurement of foreign data yields high returns for a low investment. As an example more than three-quarters of the data in the NODC station data file contains foreign data which are used over and over again by U.S. organizations. The Scientific Committee on Oceanic Research (SCOR) of the International Council of Scientific Unions has even suggested that there be an expansion of the functions and capabilities of one or more national centers, with increased international support and responsibility. This recommendation is based on the expected "flood of data" which could result as international programs are expanded.

I believe, Mr. Chairman, that a national marine data center should continue the concept of an interagency advisory board. Such a board provides the mechanism for responsiveness to all segments of the user community-government agencies, academic and private research institutions and industry.

As previously mentioned, Mr. Chairman, the Commission recommended that there be more than one data center. To quote again from their report:

"The great variety in quantity, quality, and uses of these data suggests that total environmental data cannot be handled readily by a single center and that a number of centers will be necessary for the foreseeable future. At the same time, overall policy direction of the different centers is needed to define clearly their responsibilities and relationships in order to prevent redundancies and gaps in the system and to determine priorities."

I do believe, with advances in computer and communications technology, that a monolithic National environmental data center seems inevitable. But it should be approached cautiously and within the framework of a "phased development." Merging of data functions at too early a stage could generate adverse impacts on a data system for the marine sciences. Oceanographic interests could be subjugated by demands from more pressing priorities.

Mr. Chairman, in summary, I believe that whatever the future Federal framework for oceanography, the following proposals should be seriously considered with respect to the management of marine data:

1. Data management functions be merged to create a single identifiable national marine data center.
2. Data generated as part of mission oriented activities, especially geophysical data, be transferred to the national marine data center once they have served their primary use.
3. The national marine data center would coordinate closely with the national weather data center to achieve compatibility and to monitor duplication, especially for surface layer oceanographic data required for air-sea interaction and climatological studies.
4. The concept of an interagency advisory board, functioning essentially as a board of directors reviewing budget, policy, and progress, should be continued.
5. From my viewpoint as Director of NODC, I believe that funds should be provided from a single agency. I think this would more likely result in a higher level of funding for NODC than it now receives through agency contributions and would certainly simplify administrative handling of funds.

Mr. Chairman, that completes my statement. I will be pleased to answer any questions the committee might have.

TABLE 1.—ODC SPONSORS AND CONTRIBUTIONS

Organization	Fiscal year 1968	Fiscal year 1969	Fiscal year 1970
NSF.....	\$238,000	\$250,000	\$275,000
BCF.....	167,000	200,000	218,000
AEC.....	32,000	32,000	35,000
Coast Guard.....	42,500	85,000	400,000
CERC.....	24,000	33,000	35,000
Geological Survey.....	20,000	20,000	22,000
HEW.....	5,000	5,000	5,000
Navy.....	768,000	863,000	771,200
ESSA.....	259,000	259,000	259,000
FWPCA.....	13,000	13,000	15,000
Total budget.....	1,568,500	1,760,000	2,035,200

LEVEL OF FUNDING RECOMMENDED BY ADVISORY BOARD

Organization	Fiscal year		
	1968	1969	1970
NSF.....	\$238,000	\$250,000	\$275,000
BCF.....	167,000	275,000	250,000
AEC.....	32,000	32,000	35,000
Coast Guard.....	42,500	85,180	400,000
CERC.....	24,000	33,080	35,000
Geological Survey.....	20,000	20,000	22,000
HEW.....	5,000	5,000	5,000
Navy.....	695,300	769,000	1,153,000
ESSA.....	309,000	309,000	310,000
FWPCA.....	13,000		15,000
Total budget.....	1,545,800	1,778,260	2,500,000

Mr. LENNON. Thank you, Doctor. Your testimony is both pertinent and helpful to the problems that the committee faces.

You do not say in so many words that you oppose a Government structure such as recommended by the Stratton Commission, as I understand your statement, sir. Do you or do you not believe that that is the way that we should take our first small step?

Dr. AUSTIN. I do believe, sir, that a consolidation of a number of the aspects of the marine activities of the Federal Government is in order. As to the exact type, I reserve judgment.

Mr. LENNON. As to what was the last, sir?

Dr. AUSTIN. As to the exact configuration of such a consolidation, I reserve judgment.

Mr. LENNON. What would you suggest, Doctor, should be the first step in a new Government structure? In other words, which components of the several agencies of the Federal Government which are involved in the broad spectrum of the marine sciences should be brought together in a Government structure?

You know what the Commission has reported. How do you differ from the Commission's report as to which components of the various Government agencies should be put in the new Government structure referred to as NOAA?

Dr. AUSTIN. It would seem that the most efficient consolidation would be those agencies, those activities that have a commonality.

Mr. LENNON. Well, Doctor, with your broad background, suppose you, for the record, specifically identify them, if you could, in general terms for the benefit of the members of the committee and the benefit of counsel, particularly, and myself.

Dr. AUSTIN. I think, sir, I would rather speak only for the consolidation of the marine data management functions, which is, of course, one of the aspects of the Commission's report and one of the aspects of your bill.

Mr. LENNON. Well, of course, as you know, Dr. White, the Administrator of the Environmental Science Services Administration, served on the Commission as a representative of the Department of Commerce and, of course, did not participate in the final findings and conclusions and recommendations with respect to a Government structure, but he made the very flat statement here before the committee that if there was a Government structure, or at least that is the way I recall it, that ESSA should be a part of it.

This statement was made in the presence of his cowitness who was sitting alongside of him, the Assistant Secretary of Commerce. How do you react to that as to whether ESSA should be a part of such a structure?

Dr. AUSTIN. If there was a consolidated government structure, I think I would have to concur with Dr. White because ESSA's concern with the marine environment certainly crosses all disciplines, the air-sea interaction, the pelagic waters, the coastal waters.

Mr. LENNON. That is the only thing within the Department of Commerce that is recommended to go into the new government structure.

It is interesting, Doctor, that in the colloquy between members of the committee and the Assistant Secretary of Commerce he raised the question that if the Commission considered other alternatives with respect to where these various components were taken from other structures, they didn't so state in the report.

I said, "Well, Mr. Secretary, we have Dr. White who served on the Commission here with you, and let's get his views as to whether or not the Commission considered many alternatives other than the ones they ultimately recommended."

I had no previous commitment from Dr. White as to what his answer would be, but he said quite frankly that the Commission explored many, many alternatives other than what they ultimately came up with in the form of a recommendation. That sort of placated the Assistant Secretary.

Now let's move over to the Department of Transportation. The single subagency or agency, or really it is the prime agency in a way, of the Department of Transportation is the Coast Guard.

The Commission recommended that the Coast Guard be put in the new NOAA. I asked the Assistant Secretary of Transportation who opposed that, "What is the basis on which the Department of Transportation exercises and has within its jurisdiction the Coast Guard?"

He said, "Of course transportation is related to the maritime industry."

I said, "Yes, I agree, but unfortunately you don't have jurisdiction of the maritime industry. That is over under another department and not under the Department of Transportation."

He was justifying the Coast Guard being in the Department of Transportation because of its relationship to the Maritime Administration. Yet the Maritime Administration is not under the Department of Transportation, but under the Department of Commerce.

Well, that sort of stalled that argument.

Now, what is your rationale or reasoning with respect to the proposal of the Commission to put the Coast Guard in the New NOAA structure keeping in mind that it has primarily oriented missions relating to search and rescue of course as well as many other roles and missions? Why do you object to that proposal?

Dr. AUSTIN. I think the key is your comment about the diversity of the missions of the Coast Guard both in the time of peace and in the time of a national emergency.

Undoubtedly the Coast Guard because of their oceanographic interests would be involved in some type of a Federal structure if there was a consolidation. I don't believe that I am in a position, sir, to state either pro or con about the Coast Guard in toto being moved out of the Department into whatever the Federal structure would be.

Mr. LENNON. I would say to you, Doctor, that to a degree the question was raised by the Assistant Secretary of Transportation as to the Coast Guard's roles and missions related to a national emergency.

The question was raised, "Then why wasn't that question raised when they moved them from the Department of the Treasury to the Department of Transportation?" No one raised the question that it could be utilized as a national defense component regardless of where it was located by a simple declaration of the need by the Commander in Chief, the President.

The proposal to move out of the Department of the Interior the Bureau of Commercial Fisheries and certain aspects of the Bureau of Sport Fisheries and Wildlife concerns the Department of the Interior.

They say they have the capability of absorbing the agencies recommended to go into the new agency into the Department of the Interior. That is the substance of their contention. Like the other agencies, they say, "We are ready now to take on these jobs and roles."

I have in mind that back as early as 1960 that there was a study made and the gentleman who appeared before us the other day was a member of that study commission, and they recommended a government structure and they recommended that part of the Coast Guard be put into this new government structure. They recommended before they finally wrote their report and just before ESAA came into being they put in their report that what is now ESAA should be in this new government structure, but now they say it is doing too good a job in the Department of Commerce to be taken out and should be left there.

But the same argument was made by this same group that it ought to be in the new Government structure. So that the committee finds itself impaled on not one, but on a number of horns of a dilemma as to which way we should go.

What do you know, Doctor, about the composition of the so-called Stratton Commission as to their background? Do you have a high professional judgment of those men?

Dr. AUSTIN. I knew a number of the gentlemen on the Commission, sir, and on the panels, and I have the highest respect for each of them that I have known and worked with for many years.

Mr. LENNON. I don't think there has ever been a Presidential commission appointed which really gave more of their time trying to come up with a viable national interest report. The men were dedicated and sincere. They worked hard for two and a half years.

We passed an authorization bill on the floor yesterday, the National Science Foundation, \$462 million in round figures, as I recall it. When you read that report you find out how much they are involved in the field of oceanography. They spend in round figures \$19 million a year in grants to colleges, to Woods Hole where you were at one time, and others in the field of oceanography.

Should that aspect of what they are doing related to the ocean sciences and oceanography be put into a central oceanographic and atmospheric agency? I know they won't like it. But here it is. Here we find that certain agencies, as soon as an oceanographic vessel is launched, finally commissioned and ready to sail, they have to dock it.

Where do we go from here? It just seems to me that they ought to get the management that we need so badly.

When the space organization was brought into being, suppose we had about eight Federal agencies trying to get to the moon? We wouldn't have gotten to the moon. Fortunately the only people who were interested in it was one branch of the Armed Services, the Air Force, and that is about all. We would never have gotten anywhere. I think that is generally accepted.

Counsel, do you have questions to ask of the Doctor?

Mr. CLINGAN. I have no questions.

Mr. LENNON. We are grateful to you for your appearance here today and apologize for the fact that so few of the members could attend the entire session. As you know, most of us serve on several subcommittees and we are just running from one to the other.

Dr. AUSTIN. Yes, sir.

Mr. LENNON. Let me make the announcement that on Tuesday of next week in the regular committee hearing room, 1334, Mr. Herman Pollack, the Director of International Scientific and Technological Affairs of the Department of State, and Dr. W. M. Chapman, director of marine resources of the Ralston Purina Co., will be our witnesses.

We appreciate the attendance of all of you who continue to maintain the interest.

Thank you again, Doctor, for your helpful advice. We will be calling on you to give us some more advice. I want you to think as a scientist, as a person who has been involved and as a dedicated individual, as this summary of your education and experience and publications and membership in organizations certainly is an indication of your intense interest and dedication, and if you have any ideas as we move along in these hearings feel free to contact us and we will be grateful to you.

Dr. AUSTIN. Thank you kindly, Mr. Chairman.

Mr. LENNON. The hearings will now conclude until next Tuesday morning at 10 o'clock.

(Whereupon, at 11:50 a.m., the subcommittee recessed, to reconvene at 10 a.m., Tuesday, October 14, 1969.)

NATIONAL OCEANOGRAPHIC PROGRAM

TUESDAY, OCTOBER 14, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:15 a.m., pursuant to recess, in room 1302, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. Gentlemen, the subcommittee will resume its hearings.

This morning we are delighted to have with us the Honorable Herman Pollack, representing the Secretary of State, and as the second witness after that time, the Honorable W. M. Chapman, director of marine resources of the Ralston Purina Co.

Mr. Pollack, I understand, sir, that you do have a prepared statement. The members of the subcommittee have the statement in front of them. You just proceed as you may desire.

STATEMENT OF HON. HERMAN POLLACK, REPRESENTING THE SECRETARY OF STATE

Mr. POLLACK. Thank you, Mr. Chairman.

I think it might be simplest, since my statement is brief, if I run through it quickly.

Mr. LENNON. All right, sir. Thank you.

Mr. POLLACK. I welcome the opportunity to testify on behalf of the Department of State on the report of the Commission on Marine Science, Engineering and Resources, "Our Nation and the Sea."

The Commission has shown a deep appreciation of internationally agreed solutions to issues emerging from the exploration and exploitation of ocean resources which will avoid conflict and encourage cooperation among the nations of the world.

For the past 2 years the executive branch has been engaged in examining these problems in consultation with industry, legal groups, the interested segments of the public, the marine science community, and the Congress.

We have done this with an awareness of the direction in which the Commission was moving, and in the light of this Government's participation in the international debate on the subject of seabed issues in the United Nations.

Mr. Chairman, I will not be commenting on the organizational recommendations of the Commission report, since, as you know, the

President has referred these recommendations to his Advisory Council on Executive Organization for consideration in the context of broader Federal organizational requirements.

The Department of State has found the mechanism of the Marine Council useful in assisting us in carrying out our responsibilities with respect to international marine affairs.

Mr. LENNON. Mr. Pollack, I am going to take the liberty to interject a question at this point.

You say, "The President has referred these recommendations to his Advisory Council on Executive Organization for consideration in the context of broader Federal organizational requirements."

Specifically what council are you referring to by name or identification as an organization?

Mr. POLLACK. This is the council that is headed up by Mr. Ash, and I was under the impression, sir, that the proper title was the one I used in this text.

Mr. LENNON. I just wanted you to identify it. You referred to it as a commission, I believe.

Mr. POLLACK. That is right.

Mr. LENNON. When did the President by a written communication request the so-called Advisory Council on Executive Organization, known as the Ash Commission, to consider the Commission's report, particularly that related to a proposed Government structure such as NOAA?

Mr. POLLACK. Sir, I do not have the answer to your question with me. I would have to check on that.

Mr. LENNON. Just for the record, let us put that in.

It was on May 19, 1969. I have a copy of it here.

Now, what consideration since May 19, since it is now October 14, has the Ash Commission given to the President's specific request that they explore the recommendations of the Commission report?

Mr. POLLACK. Mr. Chairman, I am afraid again I cannot answer that question.

Mr. LENNON. Let us again get the record straight.

On September 10, or more specifically about 4 months after the President by written communication to the Ash Commission had made this request, we inquired of the so-called Ash Commission if it had had an opportunity in that approximately 4 months to give any consideration to the Commission report, as requested by the President.

They responded to us on September 11, the following day, that, "We hope to launch a study within the next month or two," quoting from their communication. "After we get into the problem, we will be in a better position to estimate how long it then may take to study the President's specific request of May 19."

So that you see here now, from May until October, 4 months later, that the Commission has said, "We are not ready yet to begin to commence to think about the study, but sometime in 2 or 3 months from now we can estimate how long it might take to study the President's specific proposal."

Is that anyway for the executive branch of the Government to respond, or a Commission to respond to a specific request of the President? Do you agree with that?

Mr. POLLACK. Sir, not being familiar with the total assignment that has been given to the Ash Commission, I am not really in a position to judge.

Mr. LENNON. There has been some criticism, and it has been on both sides, in the last few days, with respect to the administration branding the Congress, and the Congress branding the President about inaction.

If I have ever seen or heard of inaction, I cannot imagine having asked a commission to make a study, and then 4 months after they have been specifically requested to do something, they come up with the idea that, "In 2 or 3 months from now we will begin to commence to see how long it will take to start the study."

This is an indication of inaction between the President and his Advisory Commission. I don't see how anybody in the Congress can be critical of the President, and the President can be critical of Congress. Here we have an instance of where the President ought to be critical of the Commission which he appointed.

I cannot imagine anybody being President calling on the Commission to do a specific job, and 5 or 6 months later they say, "We will get to it sometime."

I did not mean to interrupt you, but I just wanted you to know that we knew that this thing has been delayed now for around 5 months. If this is the sort of cooperation we get, or the sort of cooperation the President gets from his own Commission, I wonder what he gets from the other branches of Government.

Go ahead. I did not mean to interrupt you for so long.

Mr. POLLACK. I will address my remarks today to the Commission recommendations on the international legal-political framework for the seabeds, which is of main interest to the Department of State.

The Department has kept in close touch with the Marine Commission in the course of their study, and I would like to take this opportunity to compliment its members and staff for the thoroughness and diligence of their study of very complex problems.

After receiving the Commission's report, we have continued to review and study it with great interest. We consider the Commission's study of the question of a legal-political framework for the ocean floor as constituting a valuable contribution to a better understanding of the many factors bearing on the problem.

The Commission has made thorough analyses and careful recommendations. The Commission's report has usefully and effectively raised important issues and posed major recommendations which are receiving very careful study within the U.S. Government, and internationally as well, as policies regarding the seabed are developed.

The range of subjects involved before us is extremely broad. It would be impossible to address any of them in detail at this time. I will, however, briefly review the history of our international efforts and outline our approach to current problems.

You will recall that after Ambassador Pardo of Malta raised in 1967 the question of the peaceful uses of the seabed and ocean floor beyond the limits of national jurisdiction, the United Nations General Assembly established an ad hoc committee to look into the matter.

The United States played a leading role in this committee, introducing at its June, 1968, meeting a draft statement of principles con-

cerning the deep ocean floor. The United States, noting the need for further scientific and technical knowledge, has also proposed an International Decade of Ocean Exploration.

The 23d General Assembly adopted three resolutions last December cosponsored by the United States.

The first created a committee on the Peaceful Uses of the Seabed and the Ocean Floor Beyond the Limits of National Jurisdiction, composed of 42 States. The new permanent committee was instructed to study the elaboration of the legal principles and norms to promote international cooperation in the exploration and use of the seabed and ocean floor beyond the limits of national jurisdiction.

The second resolution welcomed the adoption by States of appropriate safeguards against the danger of marine pollution.

The third resolution supported the International Decade of Ocean Exploration proposed by the United States.

A fourth resolution, on which the United States abstained, requested the Secretary General to undertake a study on the question of establishing in due time appropriate international machinery for the exploration and exploitation of the seabed resources.

The United States abstained on this resolution because it had made no decision as to the desirability of such international machinery, and felt the resolution, which called for a study on the question by the Secretary General, in effect prejudged this issue.

The Secretary General has now completed his report, which sets forth a wide range of possibilities with respect to a possible international regime. This report, among other subjects, was discussed during the August 11-28 session of the Seabed Committee. Among the many political and economic forces at work facing the Seabed Committee debates, the following four now stand out clearly:

1. Recognition of the importance of the seabed, covering three-fourths of the earth's surface, from political, economic, and other points of view;

2. The desire of the lesser developed countries to play a substantial role in the development of seabed policies and to insure that the seabeds be exploited in ways which will benefit all countries, and not merely the technologically advanced countries;

3. The question of where the boundary of the area beyond national jurisdiction should be located; and

4. The demand of many countries that the seabeds be used exclusively for peaceful purposes.

Thus, the recent meeting of the UN Seabed Committee, even though it did not produce any specific, agreed recommendations, yielded a deeper understanding of the issues among its members, and useful work was accomplished.

The report drafted by the committee for the General Assembly reflected an increasing sophistication with respect to this complex subject.

The two major subjects discussed at this meeting were, first, principles governing the exploration and exploitation of the seabeds beyond national jurisdiction, and, secondly, the sort of international machinery and regime which might govern exploration and exploitation of the seabed.

On the matter of principles, this discussion was a continuation of debate at previous meetings. We were disappointed that the commit-

tee was not able to agree on a set of general principles to be presented at the Twenty-Fourth General Assembly this fall for its approval.

Nonetheless, some progress was made. The prior debate was further synthesized, and the effects of the discussion at this committee meeting will be useful in the on-going debate on this matter.

The committee will meet next in March of next year, and another meeting is scheduled for August of next year.

For our part, we continue to favor principles along the lines which we presented to the ad hoc seabed committee in June of 1968, and those formulated by the western powers at the ad hoc committee meeting at Rio in August of the same year. In essence, the most important provisions of these principles were:

1. That an internationally agreed precise boundary be established dividing that part of the seabed subject to national jurisdiction over natural resources and the deep ocean floor, which would be beyond the limits of national jurisdiction, and

2. That internationally agreed arrangements be established governing the exploitation of the resources of the seabed beyond the limits of national jurisdiction, including dedication of a portion of the value of the resources exploited to international community purposes.

One of the most difficult problems in the debate on principles is the question of a boundary to be established between the offshore limit of national jurisdiction and the area beyond which is to be governed by these principles.

As this committee well knows, there is a wide divergence of views in the international community as to whether or where such a boundary should be located. Some of the Latin American countries would prefer not to include any reference to a boundary, for fear this will ultimately prejudice their 200-mile and other extensive maritime claims.

On the matter of international machinery and regime, the discussion at this recent meeting was the first serious debate on this subject. This discussion proceeded in the light of the study prepared by the Secretary General, which I have already mentioned. It did not produce any agreed recommendations, but did afford an opportunity for our delegation and others to expose their preliminary views on this matter.

Our representatives made clear that, consistent with the principles which we have already tabled as a proposed resolution, the regime must be of a character:

- To assure orderly development of seabed resources;

- To promote exploration and exploitation of the deep seabed;

- To enable, as feasible and practicable, a portion of the value of the resources recovered from this area to be dedicated to international community purposes; and

- To assure accommodation among commercial and other uses of the deep ocean floor and marine environment.

Our representatives also suggested that a regime for the deep seabed which would be consistent with these broad purposes should include at least provision for: Individual countries to authorize the exploitation activities of its nationals and to be responsible for assuring adherence to the criteria established for exploitation; and international registry for claims; procedures to verify compliance with the criteria estab-

lished for exploitation as well as procedures to settle international disputes; liability for damages arising from the exploitation of resources on the deep seabed; and avoiding unreasonable interference with the exercise of the freedom of the high seas, or with conservation of the living resources of the seas, or any interference with fundamental scientific research.

By "criteria for exploitation," as I have used the term, we mean guidelines as to the types of resources to be exploited, the size of the claim, the duration of the claim, the circumstances for termination of a claim, the eligibility and capability of a claimant to exploit the resources, certain minimum performance requirements, a clear relationship between exploration rights and exploitation rights, and agreed standards relating to conservation, pollution, and danger to human life.

We realize, Mr. Chairman, that these suggestions and these criteria are as yet not precise as to their content or application. Nonetheless, you will recognize that our proposals have many elements in common with the recommendations of the Marine Commission, and that a great deal of discussion, both in this country and with other countries, will be needed before they can be converted into precise international understandings and arrangements.

These arrangements will not be effective, in our opinion, if they fail to provide adequately due protection for the integrity of investments, if they are not based upon broad confidence in their stability, and if they do not provide a clear opportunity for a reasonable return on risk investments, as well as a reasonable assurance of meeting the interests of all parties concerned, both among the developing nations and the developed nations of the international community.

Several members of the U.N. Seabed Committee have at times urged a freeze on exploitation. We oppose any such suggestion, believing that exploitation is necessary for mankind to enjoy the benefits of the resources found in the seabeds.

We share the view of the Marine Commission that any international framework for the conduct of minerals exploration and exploitation must give the United States and all other countries a fair chance to engage in such activities.

The Stratton Commission is certainly correct in asserting that whatever framework is created must seek to avoid and not provoke international conflict. At the same time, we believe that new exploitation should not prejudice the eventual location of the boundary.

We agree with the Commission that the existing international framework does not provide the necessary means to achieve these objectives. This view is shared by the other members of the U.N. Seabed Committee.

With the early introduction of a set of principles, and by presenting our preliminary view on the nature of the regime, the United States has achieved a position of leadership in the development of international law for the ocean floor.

The recommendations of the Stratton Commission report have been helpful to us in the development of our policies on these many difficult and complex problems.

Mr. Chairman, that concludes my statement. I would be pleased to answer any questions which you and the members of the subcommittee may have.

Mr. LENNON. Thank you, Mr. Pollack.

Mr. Mosher.

Mr. MOSHER. Mr. Pollack, going back to pages 7 and 8 of your testimony, where you have recognized the difficult problem of establishing a boundary between the offshore limit of national jurisdiction and the area beyond it which is to be governed by the international regime, you recognize that there is a wide divergence of views.

Has the State Department formulated any precise recommendations that you are making? Are you definite in your thinking as to what position this country should take on that difficult question?

Mr. POLLACK. No, sir. At this point in time, the State Department has not arrived at an agency position with respect to that question.

Mr. MOSHER. As I remember it, the Stratton Commission did make a precise recommendation, did they not?

Mr. POLLACK. Yes, sir. They did.

Mr. MOSHER. I don't have the report here in front of me, and I don't have in my head precisely what that recommendation was, but does the State Department has some doubts, some questions as to that recommendation?

Do you want to point out what the weaknesses may be in that recommendation by the Stratton Commission?

Mr. POLLACK. The recommendation of the Stratton Commission was a proposal for an intermediate zone, and the proposal for an intermediate zone is certainly among the leading contenders for serious consideration as to what position the United States and the international community might ultimately adopt with respect to this question of a boundary.

I would say simply that any proposal that is made gives rise to choices between alternatives. The question of the distinction between the rules that will relate to an intermediate zone and to the area clearly within national jurisdiction and the area that clearly will lie beyond, as well as the separation of the manner in which behavior of the explorers and exploiters will take place in this area, is one on which there is not so much a question of defects in a proposal, but questions of whether the balance that would be arrived at under the Stratton Commission proposal is the one that would be most desirable from the total viewpoint of the United States' interests.

Mr. MOSHER. Do you think there will be any consensus at all in the international community in the next year on this subject?

Mr. POLLACK. My own judgment will be that it will be a longer process than that, sir.

Mr. MOSHER. Longer than a year?

Mr. POLLACK. Yes. We have contemplated, and I have seen nothing that will alter judgment on this, that we have begun a discussion several years ago that could take many years to bring to a conclusion.

Mr. MOSHER. Do any of the more sophisticated nations involved, sophisticated in terms of their technology and their interest, have precise positions that they are pushing and sticking to?

Mr. POLLACK. No nation has, at this point. None of the advanced nations has revealed any clarity on that.

Mr. MOSHER. Russia's position would be essentially the same as ours at this point, in terms of "Wait and see"?

Mr. POLLACK. At this point the Soviet Union clearly is reserving its position and its judgment on this matter.

Mr. MOSHER. Mr. Chairman, I don't think I have any other questions.

I regret that I am going to have to leave. I regret particularly that I am going to miss Mr. Chapman's testimony.

There is a Republican conference going on right at this time, and that is the main reason for the Republican attendance being so low this morning in this committee. It is not a lack of interest.

Mr. LENNON. Thank you, sir.

Off the record.

(Discussion off the record.)

Mr. LENNON. Back on the record.

I recognize the gentleman from Virginia.

Mr. DOWNING. Mr. Pollack, I take it obviously that the State Department is not prepared at this time to either endorse or reject the Stratton Commission report.

Mr. POLLACK. That is correct, sir.

Mr. DOWNING. At what point in time do you think you will be able to give some position?

Mr. POLLACK. I would hate to be tied down to a firm prediction. We are working on this, not only within the State Department, but throughout the executive branch, and I think I would be best advised to say that we will come to a conclusion as soon as we possibly can.

Mr. DOWNING. Could you name a year?

Mr. LENNON. Would the gentleman yield at this point?

Mr. DOWNING. I yield.

Mr. LENNON. I am delighted that some of the agencies of the Federal Government have been since January of this year giving consideration to the Stratton Commission report.

I call your attention again that the specific commission that the President asked for a definitive position with respect to the Government structures recommended it in have not even considered it yet, when he asked them on May 19.

This is a Commission or Advisory Council on Executive Organization that you referred to, that would make the decision for the administration, likely, but if this is any indication of what is going on with respect to the other Government departments and agencies, as to when it can take a position, I don't expect you ever to take one, because the one that was selected to make the study and recommendation has not started yet in its consideration of the recommendation, according to their own written statement, and they hope to get ready to start to begin to commence sometime in the next 2 to 3 months.

That is nothing less than ridiculous, it would seem to me.

Mr. KEITH. Mr. Chairman—

Mr. LENNON. If the gentleman will permit me.

Mr. DOWNING. I yield to my friend.

Mr. KEITH. I wonder if that Commission is sufficiently interested and staffed to have a representative here this morning.

Mr. LENNON. I would think no.

Mr. KEITH. I would, too.

Mr. LENNON. Mr. Karth.

Mr. KARTH. Thank you, Mr. Chairman. I have no questions.

Mr. LENNON. Mr. Keith.

Mr. KEITH. Living up to my promises, I have no questions at this time.

I do appreciate your outlining for us the situation as it exists with reference to the Malta resolution and other aspects of the problem. Thank you.

Mr. LENNON. Mr. Karth.

Mr. KARTH. Mr. Chairman.

Do you need additional people within the State Department to put their minds on this problem, so that you can come to some determination within this decade?

Mr. POLLACK. The State Department probably can always make use of additional staff, but that is not the problem.

Mr. KARTH. I suggest that we may pass a foreign aid bill this year that should relieve a considerable number of State Department people, and I don't know what could be better served, Mr. Chairman, than to have them work on this problem.

Mr. POLLACK. The complexity of the problem, both in trying to ascertain the balance of considerations that would dictate where the U.S. interests lie, as well as the very many diverse views that are held on this question internationally, is the basic reason for the pace at which we are moving now.

Mr. KARTH. It just seems to me that the United States might offer some leadership occasionally, and take a position. If somebody does not agree with it, at least you have a start, and you have a position from which you can negotiate.

If nobody ever moves or takes a position, we wait with great international intrigue. The Chairman is right, that a decision will never be made, and a position will never be taken, and the one thing that the Commission recommended we be careful of is the thing that is going to happen. That is, we are going to get involved in serious controversies that will lead to international incidents. That is what will happen.

Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Karth.

Mr. Pollack, the main thrust and interest of the Department of State, of course, is the international legal-political framework of the seabeds. I am sure that you gentlemen have reviewed in depth the Commission's recommendations related to the Continental Shelf.

Incidentally, what page in the report is that found on, without looking it up, because I know you know?

Mr. POLLACK. Toward the middle of the report.

Mr. LENNON. That is a pretty good guess. It starts on page 145.

Of course it goes through the seabeds. It is about possibly five pages of the Commission's report which relate to the things that you all are interested in.

I understand, and rightly so, that the United States refrained from the introduction of the resolution of June of last year, 1968, concerning the deep ocean floor, but nevertheless, in spite of the abstinence from the resolution by the United States, the resolution was adopted in this respect, and the first report I believe came out or was discussed, I believe you said, in August of this year.

Mr. POLLACK. Yes, sir. This is on the international machinery.

Mr. LENNON. It is interesting to note what came out of that report. There was more or less of a consensus recognizing the importance of the seabeds out of this resolution, which you indicate covers three-fourths of the earth's surface, both from the political, economic, and other points of view. It became apparent, according to your statement, that the so-called Malta Resolution got back into this study and it was the desire of the lesser developed countries to play a greater role in the development of seabed policies and to insure that the seabeds be exploited in ways which would benefit all countries, and not merely the technologically advanced countries.

That is in substance what the Malta Resolution was all about, was it not?

Mr. POLLACK. Yes, sir.

Mr. LENNON. So that what you have here is a recapitulation or a reaffirmation through this study created by this resolution, from which our Government abstained, of the same position taken by the Malta Resolution.

Is that generally a fair statement?

Mr. POLLACK. The resolution, Mr. Chairman, from which we abstained was one which called upon the Secretary General to prepare a report on international machinery. This resolution did carry. That report was prepared by the Secretary General, and it was considered at the recent August meeting by the Economic and Technical Subcommittee, and, as a matter of fact, was the principal subject of discussion.

Now, that discussion, as all other discussions, reflects the interests of the developing countries for a substantial voice in the decisions that are going to be taken with respect to the ocean floor and its resources.

Mr. LENNON. Now, as a result of this resolution that we referred to, "for the Secretary General to undertake a study on the question of establishing in due time appropriate international machinery for the exploration and exploitation of the seabed resources," did they come forward with any specific recommendations, or only the general things that you referred to on page 5 of your statement?

Mr. POLLACK. The Secretary General's report itself simply explored the alternatives, tending to group them into three major possibilities. One would be a registry. One would be a licensing authority, and the third would be an operational authority.

It was these three alternatives that formed the focus for the discussion in the subcommittee this past August.

The most accurate way to summarize that discussion is to say that the various countries exposed their preliminary views on this subject.

Our representatives made, I think, a very excellent case in their statements as to what the deficiencies and shortcomings of an operational international authority would be.

The summary that was prepared by the subcommittee itself of its activities pretty accurately reflects that practically every side of this question was exposed, and that no consensus at this point is in sight, except possibly the fact that almost everyone agrees that there ought to be at the minimum a registry of some kind.

Mr. LENNON. Mr. Pollack, this country does not recognize the territorial waters of any nation beyond the historic 3-mile limit, do they?

Mr. POLLACK. I believe that is correct.

Mr. LENNON. You say we don't recognize beyond the historic 3-mile limit?

Mr. POLLACK. We do not recognize it.

Mr. LENNON. We do not recognize it, but when one of our fishing vessels is seized 190 miles at sea off the coast of Ecuador or Chile or Peru, we immediately capitulate—the gentleman is shaking his head—and pay the fines and forfeitures for the seizure of those vessels, even though they are frequently seized by vessels built in the United States and given free, in many instances, to these nations. They are Navy vessels that have been turned over to Ecuador and Chile.

Is that a fair statement?

Mr. POLLACK. I don't think I would put it that way, sir.

Mr. LENNON. How would you put it?

Mr. POLLACK. I wonder if you might permit me to put this question to someone who has followed this problem much more intimately than I have.

Mr. LENNON. You are here representing the State Department.

Mr. POLLACK. Yes, I am.

Mr. LENNON. You say this Nation does not recognize the territorial sea of any nation beyond the 3-mile limit. Yet, when our fishing vessels were seized 190 miles off the shore of the three Latin American nations that I named, we immediately do what?

Do we withdraw diplomatic recognition of those nations for the violation of the international waters, which you say we recognize, or do we pay the fines and forfeitures or penalties?

Mr. POLLACK. We have been confronted, as you know—

Mr. LENNON. I get real frustrated by this sort of a philosophy, that we do not recognize beyond the territorial limit of 3 miles, and yet our State Department, in the image of good relations with our Latin American neighbors, has to do these things. People don't understand it. They don't understand why.

Mr. POLLACK. It is a frustrating problem, if I may say so, Mr. Chairman.

Mr. LENNON. What is the answer to it?

Mr. POLLACK. I really, at this point, do not know.

Mr. LENNON. I think somebody is giving you a suggestion as to how you could answer.

Mr. POLLACK. I am aware of what I am being told to say here.

Mr. LENNON. Go right ahead.

Mr. POLLACK. The question of what sanctions the United States is going to employ any time there is a violation of our rights anywhere, be it on the high seas or elsewhere, is a question, as you well understand, which requires very, very careful consideration of a whole host of factors that are pertinent.

We have protested the action of the Latin American countries that have interfered with our fishing vessels. We have sought a means of accommodation on this.

Mr. LENNON. At numerous conferences.

Mr. POLLACK. We have recessed the first session of our conference and we have all gone home to our respective capitals to consult on the statements and positions that have been put forward at that meeting, and we will continue this process until we work out a solution that is equitable and fair.

Mr. LENNON. Now, at this last conference, the net result was that you agreed to have another conference?

Mr. POLLACK. That is right. At least the subject is still alive, still being discussed, and at some point I hope we can work out a proper solution to it.

Mr. LENNON. I can appreciate how the State Department is impaled on the horns of not one but several dilemmas, but the average citizen just does not understand our bold statement that we recognize only to the 3-mile limit, and yet so frequently these seizures are experienced, and they read where the fines and penalties are paid, and we go happily on our way.

I just wonder sometimes if that encourages respect by other nations around the world for the United States.

I don't know what the alternative is. I think nobody knows. But I am just inclined to believe that the average citizen today believes that the time has come for us to take some positive and definitive stand with respect to what we are told are our rights.

Are there any other questions?

Does counsel have questions?

Mr. CLINGAN. I have one or two, Mr. Chairman, if I may.

Mr. Pollack, is there general accord among the agencies of Government on the policies with respect to ocean beds?

Mr. POLLACK. There has been general accord on the part of the agencies of the executive branch with respect to the positions that we have taken at the U.N., so that in this regard the answer to that question would be in the affirmative.

Of course, there are different interests on the parts of the agencies with respect to seabed policies, and there is a divergence of views with respect to some of the problems that confront us.

Mr. CLINGAN. On September 24, before the Senate Commerce Committee, Mr. Train from the Department of the Interior said—

Leases have been issued offshore California for submerged lands in waters up to 1,800 feet deep. Some of these have been drilled and oil has been found in substantial quantities. It is our position that in mapping these areas, and issuing leases thereon, the Department has proceeded in full accord with both national and international law governing the rights and interests of the United States in its Outer Continental Shelf.

Does the State Department agree with that position?

Mr. Pollack. At this point, we are supporting the rights which we have under the Continental Shelf Convention and international law, and the authority of the Department of the Interior to administer the Outer Continental Shelf Lands Act.

Mr. CLINGAN. On page 11, Mr. Pollack, you say you favor a freeze on exploitation. Do you favor a moratorium on claims of sovereignty?

Mr. POLLACK. That is one of the questions which we have had under consideration in the executive branch, and on which there has not yet been developed an executive branch position.

We are very anxious that no country at this point make any assertion to jurisdiction with respect to resources which is not well founded in international law.

Mr. CLINGAN. Beyond what point would you freeze exploitation?

Mr. POLLACK. We would not freeze exploitation. Our position is in the negative on that.

I am sorry. I did not hear your first statement.

Mr. CLINGAN. I see.

You mentioned that in formulating policy that you found the National Council useful, I think was the word that you used. Could you give us a little idea of what role the Council plays in helping to coordinate agency policy with regard to seabeds?

Mr. POLLACK. The Marine Council has served as the principal forum in which the various agencies of the Government have met both at the Cabinet level, at senior policy level, and at working level on a wide range of matters relating to the seabed.

It has been, among other things, a forum in which this Government's examination of what its role might be in the international decade has taken place. It has reviewed the questions of policy with respect to management of the coastal zone.

We have examined from time to time questions of international cooperation in oceanographic activities independently of the decade, and we have occasionally made presentations to the entire Council which covers a broader governmental spectrum than is involved actually in the international field of the positions, and developments that have taken place in the international arena.

So that it has served both as a vehicle of effective communication and development of coherent understanding, but it has also served as a stimulus for action on these matters.

Mr. CLINGAN. I will not ask you to state any position which has been developed there, but has there been a consensus among the Council with respect to limitation of the Continental Shelf or regions beyond that point?

Mr. POLLACK. No, sir. That question has not been put to them.

Mr. CLINGAN. The Commission did come up with a recommendation.

Mr. POLLACK. But that question has not been put to the Council in a form that would lead to development of a consensus.

Mr. CLINGAN. The Commission has formed an opinion on that. Has, to your knowledge, the National Petroleum Council formed an opinion on it?

Mr. POLLACK. Yes, the National Petroleum Council has issued a report.

Mr. CLINGAN. Has the American Bar Association formed an opinion?

Mr. POLLACK. Yes, the American Bar Association has addressed itself to that.

Mr. CLINGAN. Has the Marine Council formed an opinion?

Mr. POLLACK. The Marine Council has not.

Mr. LENNON. Mr. Pollack, how many civilian agencies of the Federal Government do you happen to contact from time to time related to matters concerning the ocean bed, or the Continental Shelf, or many of the other things that we are concerned with here?

Mr. POLLACK. There are about five or six that have a principal interest in the question of the seabed boundary and regime, the questions that are under discussion at the U.N. There are another half dozen that have inputs and would be consulted, depending upon the specific question.

If, for example, we would concern ourselves with the question of scientific research, then the National Science Foundation, the ESSA side of the Department of Commerce, even the Smithsonian Institution

would have a legitimate interest in the question, and a contribution to make to it.

Mr. LENNON. Do you think it would be helpful, then, if many of these were combined in a single independent Government structure that was answerable only to the Chief Executive? Would it be helpful to the State Department if these were brought together in a single agency?

Mr. POLLACK. The principal interest of the State Department in the orientation of the Government in this and in other fields is with respect to developing a coherent approach to our international obligations, and to the international community.

We are interested in having the Government so behave that regardless of who happens to be the spokesman for it, we speak with more or less a single voice when we speak to the rest of the world.

It seems to me that there is more than one way in which this might be brought about. The organization approach is certainly one of the ways in which this might be done.

Mr. LENNON. Did the Department of the Interior confer with you, or someone in the State Department, with relationship to the contracts or leases that it gave that were referred to by Assistant Secretary Train of the Department of the Interior read a few minutes ago?

Mr. POLLACK. The Solicitor's Office of the Interior Department and the Legal Adviser's Office of the State Department have arranged for consultation on a continuing basis with respect to such matters, sir.

Mr. LENNON. You mentioned the Marine Science Council, headed up by the Vice President, in which there are a number of Cabinet officers, officers of Cabinet level. Would you say that that has been helpful in coordinating these activities?

Mr. POLLACK. In my opinion, it has been helpful.

Mr. LENNON. Could you tell us why the administration fought or resisted the efforts of Congress to establish the Marine Science Council?

Mr. POLLACK. Well, that goes back several years. Suffice it to say that I congratulate the Congress for the initiative it took in that regard.

Mr. LENNON. They took the position that it would simply be an extension of the old Interagency Committee on Oceanography. We took the position that it ought to be a higher level policy group, but the administration opposed that.

We finally insisted upon it, and within 6 months they were the first to acknowledge that it was a fine move on the part of Congress.

But if we had followed the insistence of the administration, there would have been no National Marine Science Council such as we have today, that you have just commended, as well as every other witness. It is just an indication that sometimes the Congress is right.

Mr. POLLACK. I think they are right quite often.

Mr. LENNON. Let us hope they will be right in this, regardless of whether we have to wait forever on the position of the administration or not.

Are there any other questions, gentlemen?

Thank you, Mr. Pollack. I appreciate your candor and frankness.

I for one, and other members of the committee, recognize the turbulence that you have to face in making known the position of our country on the part of the State Department, which does speak for our country to the other nations of the world.

Mr. POLLACK. Thank you.

Mr. LENNON. Our next witness, gentlemen, has already been introduced.

Dr. Chapman, will you come forward, and if you have anybody with you, Dr. Chapman, we will be delighted to have him sit with you at the table. Without objection, I request Dr. Chapman's biography appear at this point in the record.

(The biography follows:)

BIOGRAPHIC SKETCH OF W. M. CHAPMAN AS OF JULY 1969

1. Born, Kalama, Washington, 1910. Raised in the Columbia River Salmon Industry.

2. Married, Mary Elizabeth Chapman, 1935, Children Lewis M.; Alan B.; Jane E.; Thomas M.; dec., Jonathan E.; and Kathryn A.

3. Educated, School of Fisheries, University of Washington, B.Sc. : 1932; M.Sc. 1933; Ph.D. 1937.

4. Professional Occupation:

(a) Biologist, International Fisheries (Halibut) Commission 1933-35 (Ocean Research).

(b) Biologist, Washington State Department of Fisheries, 1935-41 (herring, clam, salmon, Grand Coulee and sardine research).

(c) Biologist, U.S. Fish and Wildlife Service, 1941-42 (Fur Seal Research).

(d) Biologist, Washington State Department of Fisheries, 1942-43 (Oyster Research).

(e) Curator of Fishes, California Academy of Sciences 1943-47 (Ichthyology; Steinhart Aquarium).

(f) Fishery Development Officer, Central and South Pacific theaters of war; Board of Economic Warfare (establishing subsistence fisheries at advanced island bases) 1943-44.

(g) Director and Professor, School of Fisheries, University of Washington, 1947-48 (Fishery Education).

(h) Special Assistant to the Under-Secretary for Fish and Wildlife, Department of State, 1948-51 (Law of the Sea; Fishery Diplomacy; International Fishery Commissions and Oceanography).

(i) Director of Research, American Tunaboat Association, 1951-59 (Law of the Sea; Fishery Development; Ocean Research Application).

(j) Director, The Resources Committee, 1959-61 (application of science and technology to fishery development).

(k) Director, Division of Resources, Van Camp Sea Food Company; 1961 to 1968 (application of science and technology to fishery development on a world-wide basis).

(l) Director, Marine Resources, Ralston Purina Company (of which Van Camp Sea Food Company is now a Division) 1968 to date (staff advisor in Ocean Affairs to Chairman of the Board and Chief Executive Officer).

5. Current extra-curricular professional activities:

(a) Member and Vice-Chairman, Advisory Committee for Marine Resources Research, Food and Agricultural Organization of the United Nations.

(b) Consultant from time to time, Special Fund of the United Nations.

(c) Member, Joint Working Party on the Scientific Aspects of International Ocean Research of Advisory Committee on Marine Resources Research of the Food and Agricultural Organization of the United Nations; Scientific Committee on Ocean Research of the International Council of Scientific Unions; and World Meteorological Organization (Advisory Group on Ocean Research).

(d) Member, Panel on International Marine Science Affairs, Committee on Oceanography, National Academy of Sciences.

(e) Member, Committee on Marine Protein Concentrate Development, Food and Nutrition Board, National Academy of Sciences.

(f) Member, Committee on Space Programs for Earth Observation Research, National Academy of Sciences.

(g) Member, Board of Directors, Living Marine Resources, Inc.

(h) Member, Marine Research Committee, California Department of Fish and Game.

(i) Commissioner and Chairman, California Advisory Commission on Marine and Coastal Resources, State of California.

- (j) Member, Board of Directors, Marine Technology Society.
- (k) Member, Advisory Committee, Inter-American Tropical Tuna Commission.
- (l) Member, Legislative Committee, American Fishery Research Biologists Institute.
- (m) Consultant, National Council on Marine Resources and Engineering Development.
- (n) Member, Natural Resources Committee, National Association of Manufacturers.
- (o) Member, Board of Directors, National Oceanography Association.
- (p) Member, Board of Consultants, U.S. Naval Oceanographer.
- (q) Member, Visiting Committee, College of Fisheries, University of Washington.
- (r) Member, Advisory Council, Law of the Sea Institute, University of Rhode Island.
- (s) Member, Oceanographic Advisory Committee, Department of State.
- (t) Member, Fishing Industry Advisory Committee, Department of State.
- (u) Member, U.S. delegation to international conferences and meetings from time to time in ocean science and law (Intergovernmental Oceanographic Commission; Food and Agriculture Organization of the United Nations; U.N. Law of the Sea; United States-Japan Tuna Trade; FAO Working Party on Rational Utilization of Atlantic Tuna; Indian Ocean Fisheries Commission; Indo-Pacific Fisheries Council; West African Fisheries Commission, etc.).
- (v) Member, Steering Committee, Pacem in Maribus, Center for the Study of Democratic Institutions.
- (w) Member, Working Party on Indicative World Plan for Fisheries, Food and Agriculture Organization of the United Nations.
- (x) Consultant Sea Grant College Program, National Science Foundation.
- 6. Recent (past decade) but concluded, professional assignments:
 - (a) Participant, Symposium on West African Tuna, convened by Commission for Science and Technology in Africa South of the Sahara, Dakar, Senegal (1960).
 - (b) Survey of fishery development opportunities in Western Region, Nigeria, for Special Fund of the United Nations (1960).
 - (c) Participant, Symposium on Indian Ocean Tuna, convened by Marine Biological Society of India, Mandapam Camp, South India (1961).
 - (d) Survey of fishery development opportunities of East Africa from Aden to Cape Town for Van Camp Sea Food Company (1961).
 - (e) Chairman, Working Party on Fishery Oceanography, Scientific Committee on Oceanic Research, International Council of Scientific Unions (1961-62).
 - (f) Survey of fishery development opportunities in Indonesia, for Government of Indonesia (1962).
 - (g) Survey of fishery development opportunities in Aden and Eastern Aden Protectorate for Governments of Federated Arab Emirates of the South and of the Qaiti State (1962).
 - (h) Survey of fishery development opportunities in India, for Government of India and USAID (1963).
 - (i) Survey of fishery development opportunities in Cape Verde and Madeira Islands, for Portuguese firms (1963).
 - (j) Survey of fishery development opportunities in Philippines for Van Camp Sea Food Company (1963).
 - (k) Survey of fishery development opportunities in West Africa for Van Camp Sea Food Company (1964).
 - (l) Rapporteur, 1st session, FAO Working Party for the Rational Utilization of Tuna Resources in the Atlantic Ocean, Rome (1963).
 - (m) Participant, First International Congress on Oceanography of Western Latin America, convened by UNESCO, Lima, Peru (1964).
 - (n) Survey of fishery development opportunities of Lesser Antilles and Netherlands, West Indies for Van Camp Sea Food Company (1964).
 - (o) Member, Panel on Marine Sciences, Latin American Science Board, National Academy of Sciences (1964).
 - (p) Member, African Science Board, National Academy of Sciences (1964-69).
 - (q) Field trip through West and North Africa for African Science Board (1965).
 - (r) Rapporteur, 2nd session, FAO Working Party for the Rational Utilization of Tuna Resources in the Atlantic Ocean (1965).
 - (s) Chairman, Panel on Marine International Science Affairs, Committee on Oceanography, National Academy of Sciences (1965).

(*t*) Chairman, Fishery Panel, National Security Industrial Association, Ocean Science and Technology Advisory Committee (1965-67).

(*u*) Survey of fishery development opportunities in New England and Nova Scotia for Van Camp Sea Food Company (1965).

(*v*) Member, Advisory Council, Institute of Marine Resources, University of California (1965-69).

(*w*) Member, Governor's Advisory Commission on Ocean Resources, State of California (1964-67).

(*x*) Member, Study Group on National Fishery Center and Aquarium, Department of the Interior (1965-68).

(*y*) Survey of fishery development possibilities in Chile, Argentina, and Brazil for Van Camp Sea Food Company (1966).

(*z*) Participant, VII International Congress of Nutrition on request from Government of Federal Republic of Germany, Hamburg, Germany (1966).

(*aa*) Invited speaker, Committee on Fisheries, 2nd session, Food and Agricultural Organization of the United Nations, Rome (1967).

(*bb*) Member, Joint Working Party on International Ocean Affairs of ACMRR (FAO)/SCOR (ICSU) WMO (AC) at Helio Cabala, Italy (1967).

(*cc*) Member, Workshop on Fisheries and Oceanography in the Philippines, jointly organized by U.S. National Academy of Sciences and Philippines National Science Board, Manila (1967).

(*dd*) Consultant, Resources for the Future (1967).

(*ce*) Member, Group of Experts Advisory to the Secretary-General of the United Nations on Marine Science and Technology pursuant to General Assembly Resolution 2172 (xxi) 1966 (Resources of the Sea)—(1968).
Center, University of Hawaii, Honolulu (1968).

(*ff*) Consultant to Government of Iran on fishery development (1968).

(*gg*) Member, Study Group on Indo-Pacific Fishery Development, East-West Center, University of Hawaii, Honolulu (1968).

(*hh*) Participant, American Assembly on Uses of the Sea, Columbia University, New York (1968).

(*ii*) Participant, Symposium "Toward a Better Use of the Ocean: A Study and Prognosis", International Institute for Peace and Conflict Research (SIPRI), Stockholm, Sweden (1968).

(*jj*) Member, Steering Committee on the International Decade of Ocean Exploration, National Academy of Sciences/National Academy of Engineering (1968-69).

(*kk*) Consultant, Presidential Commission on Marine Sciences, Engineering and Resources (1968-69).

(*ll*) Member, Study Group on National Data Buoy System, U.S. Coast Guard (1969).

(*mm*) Chairman of Panel, Occidental College—American Assembly Uses of the Sea Symposium, San Diego (1969).

(*nn*) Member, Advisory Committee on the Disposal of Chemical Warfare Weapons, Department of State (1969).

(*oo*) Chairman, Panel on Fisheries, National Council on Marine Resources and Engineering (1967-69).

(*pp*) Consultant, National Planning Association (1969).

7. Professional honors:

(a) Fellow, John Simon Guggenheim, Jr., Foundation.

(b) Fellow, California Academy of Sciences.

(c) President, Van Camp Foundation.

(d) Man of the Year, National Fisheries Institute, 1966.

(e) First Sea Grant College Award, 1968.

8. Publications—Upwards of 250 papers on ichthyology, fishery development, Law of the Sea, fishery economics, ocean science, and book "Fishing in Troubled Waters".

9. Guest lecturer from time to time—University of California, Los Angeles; University of California San Diego; University of Rhode Island; Rutgers University; University of British Columbia; University of Washington; Stanford University; Long Beach State College; San Diego State College; Oregon State University; San Francisco State College; Fullerton State College; Gordon Research Conference; American Chemical Society; American Management Association; Fishery Council of Canada; National Fisheries Institute; etc.

**STATEMENT OF W. M. CHAPMAN, DIRECTOR OF MARINE
RESOURCES, RALSTON PURINA CO.**

Dr. CHAPMAN. No, sir. I am a lone wolf.

Mr. LENNON. Most private industries have become lone wolfish.

Mr. DOWNING. Mr. Chairman, I regret that I have an appointment with people waiting in my office. I would like to say that I have read this statement, and I concur 100 percent with what he has to say, and the way he said it. I think you will concur with what I have said.

Mr. LENNON. Thank you.

Do you want to stay with your statement? You have time to stay with it, if you want to.

Dr. CHAPMAN. Perhaps I can moderate between the two points of reading fully and skimming and hit the highlights.

Mr. LENNON. Without objection, immediately following your off-the-cuff statement, your full remarks will be inserted in the record.

Dr. CHAPMAN. Thank you, sir.

My name is W. M. Chapman. I have given my curriculum vitae current to July of this year.

I am very pleased that you asked me to comment on H.R. 13247. I think it to be an excellent bill, and one of very great practical importance not only to the United States, but to the world, as I shall develop below.

This notion is not a very new one, and I have given some of the antecedents, including the fact that I recommended similar legislation to this committee in testimony in 1965, upon which Senator Muskie on behalf of himself and I think 19 other Senators submitted comprehensive legislation to this effect to the other body in 1965. That effort died through opposition that came almost entirely from within the executive branch of the U.S. Government.

Mr. LENNON. That is sort of par for the course, is it not, Dr. Chapman?

Go ahead.

Dr. CHAPMAN. The ideas which I expressed in testimony on this subject before the committee in 1965 were not original on my part. They arose out of the scientific and Government community dealing with marine affairs during the course of the broad studies which led to the NASCO 1967 report.

Essentially, the ICO had done such excellent work in the short years of its existence that the nation's marine affairs had grown beyond the capabilities of that mechanism of Government to move them further at the pace the Nation required them to move.

The reason why I presented those views in 1965, and that they were not presented then by NASCO or others associated with it, was that these views had drawn criticism from elsewhere within the Federal governmental structure, and I was the only one then involved whose independence of position made it practical for me to present them to your committee, and not fear any criticism that would arise.

The opposition in the Federal structure to such a consolidation of civilian marine affairs in 1965 came from four main sources, which you will immediately recognize, being still the ones you have.

First, the Bureau of the Budget; second, the Office of Science and Technology, in the President's Office; third, the several Departments

who would lose functions to the new agency; and forth, the Department of the Navy.

I might say that at that time there was also modest opposition from within the academic scientific community, but mostly from those elements which drew considerable funding support from the Navy at that time.

The Bureau of the Budget opposition was, and perhaps still is, simply that it did not wish constructed another large entity like NASA that would have so much congressional support that the bureau could not control its funding support with suitable ease.

With the civilian ocean establishment split between several Departments, the bureau could, and did, and does, control, or stifle, growth in ocean-oriented activity with considerably greater ease, on the tried and true basis of divide and conquer.

The Office of Science and Technology opposition was the effective surface one in 1964 and 1965, when that office delayed by effective lobbying the passage of the Marine Resources and Engineering Act of 1966 as long as it could, and set up the Panel on Oceanography of PSAC, and so forth.

The motives of the President's Science Advisor were not clear at that time, but it seemed to be not wishing the sphere of marine affairs to ship out of the grasp of his office, as it certainly would do with the creation of a National Oceanic and Atmospheric Agency. This was ridiculous parochialism, because oceanography had already broadened into what we now call ocean affairs in the minds of Congress and the public, and OST had already lost the control of the action.

They cannot get it back. It has broadened beyond them. Perhaps with the new administration and the new Science Advisor this motivation will have mitigated. I know nothing about that.

Mr. LENNON. I wish we could be optimistic about it.

Dr. CHAPMAN. In 1965, the Departments of Government which would have lost functions to a NOAA were uniformly opposed to such a NOAA concept on strictly empire-protection grounds. Each of them thought it could do the job better than any new agency, and really that it should have the whole job.

So far as I know, that is still the vigorous position of each of the departments affected, except that one of the departments has changed in the interim, from the Department of the Treasury to the Department of Transportation.

I predict that the Congress will simply have to walk over the top of Interior, Commerce, Transportation, and Bureau of the Budget, if it is going to form a NOAA, because each of those wants to keep all it presently has, plus getting the other fellow's part, if possible, and also the forces are so equally balanced in the executive that I am not sanguine of even this rather modest bill becoming law.

The view of the Department of the Navy has seemed to be different than that of the other departments, and in my mind, more serious. I don't think that anybody pushing for a NOAA, or a similar agency, has ever seriously proposed taking away any Navy function to give to it, except the National Ocean Data Center, which is really outside the Navy anyhow, and working under conditions pretty satisfactory to the Navy.

The Navy's opposition, or faint and damning praise, seem to derive from an unspoken fear that a strong NOAA would weaken the ability

of the Navy to fund the specialized and general ocean research and engineering work that it required for its own particular needs.

This could be a serious problem. In my view, the Navy must be able to fund scientific and engineering ocean research and development on a substantial scale, of a nature not quite that required for civilian applications, if it is to fulfill its mission effectively.

I think that is a quite general view, and it might be well to state that in this bill, to reassure the Navy, as was done in Senator Muskie's 1965 bill.

The one thing that has changed steadily in favor of NOAA in these recent years has been opinion at the working level in the affected Government agencies.

This is not an opinion which the Congress can get in open testimony, because working level people in government cannot testify contrary to departmental position without fear of disciplinary action. Nevertheless, the working level opinion on the need for this consolidation has strengthened sharply during the past 5 years, as Professor Clingan and I, who circulate around amongst these circles, know very well. People tell us one thing, and they cannot tell that to you.

The same is true of positions in the academic scientific community, although ordinarily no two scientists ever agree on precisely how such a reorganization should be done.

I know of no objection to the concept of a new agency on ocean affairs in the scientific community. The backing and filling is concerned with what functions should go into it.

My view on what components should go into NOAA, and how the congressional committee assignments should reflect this, is also different than expressed in H.R. 13247. It still remains what I told the committee in 1965, and as was subsequently expressed more cogently than I did by Senator Muskie in his bill of that year.

I do not consider those differences, however, to be consequential, or even very pertinent. NOAA, as expressed by the National Commission, and as incorporated in H.R. 13247, is, in my view, the most important step the Congress can take in enhancing the posture of the United States in respect of the ocean, and I support its adoption unequivocally. I find no fault with either the rationale, the analysis, or the recommendations the Commission made in this aspect of its work.

The elements included in NOAA by the Commission's recommendations, and in H.R. 13247, encompass the key agencies and functions to provide a viable and desirable core to which other activities could be added from time to time, if further consideration showed such additions to have merit.

I think, myself, and have for a long time, that the merchant marine functions of government, at least, should be added to NOAA, and as soon as politics permit. As a matter of fact, I am surprised that the maritime unions are not demanding this action, and expect that in due course they will.

I am aware that large sections of the Federal structure are under serious study from the standpoint of reorganization, and I am sure that the whole structure would benefit from substantial stirring up and modernization.

This, however, will take a considerable amount of time, and we are already so delayed in getting a suitable Federal ocean structure that

I do not believe we can safely wait longer. I view this urgency not only from the national, but from the State and international viewpoints.

In the State of California, I am chairman of the California Advisory Commission on Marine and Coastal Resources. You have heard very much the same as I am going to tell you now from Lieutenant Governor Reinecke, who is chairman of our Interagency Council on Marine Resources in the State government.

Our main problems are connected with the Coastal Zone. Population, industry, and all social and economic forces in California concentrate steadily and intensively on the interface between land and water. With each month, those pressures become more critical within the band a few miles to sea and a few miles inland from that interface.

We are getting our State activities into fairly good order, and in this are perhaps somewhat more fortunate than some of our sister States. Progress at our State level has been particularly good this year, since Lieutenant Governor Reinecke has taken a firm hold, and we now seem to have up a pretty good momentum, but we must deal with so many agencies in the Federal structure that it makes our State work all the more difficult. At the State level we very badly need a strong ocean-oriented agency in the civilian area of the Federal Government that can help us with our problems, instead of a clutch of diverse agencies who at times seem to be more trouble than they are worth, simply because one needs to spend most of one's time in liaison and communication with them rather than all hands getting on with the necessary work.

I believe that almost everyone professionally acquainted with ocean matters agrees with me that the most urgent problems the Nation has with the ocean are those centering in the coastal zone. Here are the estuarine, pollution, multiple-use, aesthetic, industrial, recreation, social, and economic problems that are so complex, difficult, and interdigitating as to try the patience of Job and the wisdom of Solomon.

I believe, also, that most believe these can only be dealt with effectively at the local level. At least that is my experience. To do this effectively, the State people must have the help of a strong and coherent Federal entity such as NOAA.

For a good many years I have been Vice Chairman of the Advisory Committee on Maritime Resources Research of the Food and Agricultural Organization of the United Nations. ACMRR advises the Director General of FAO on the activities of its Fisheries Department on a worldwide basis, and has the separate additional duty of being one of the two official advisory bodies of the Intergovernmental Oceanographic Commission of UNESCO.

We work very closely with the other advisory body of IOC, the Scientific Committee on Ocean Research, SCOR, of the International Council on Scientific Unions, ICSU, and over recent years with appropriate advisory groups from the World Meteorological Organization, WMO.

In these connections, we have also had advisory relations with the Secretary General of the United Nations in his responses to various ocean initiatives that have arisen in the General Assembly of the United Nations over the past few years. I have just returned from ACMRR and IOC meetings in Paris.

When I had written this, I had just returned from ACMRR and IOC meetings in Paris, but since then I have been in Africa for the

United Nations Development Program, and stopped off in Rome for sessions at FAO last week. I must say that amongst international servants in these international bureaucracies it is a widespread feeling, that we cannot move ahead much more rapidly in the effective organization of international ocean activities at the UN and specialized agency level until a major nation like the United States straightens out its own governmental ocean organization inside. This is felt rather broadly in the international community to be a necessity.

From this international viewpoint, where I and my colleagues work in our capacities as independent experts from the scientific community, and not as representatives of the U.S. Government, the policies and postures of the U.S. Government appear at times to be almost incredible.

The Department of State has undertaken repeated initiatives through the General Assembly and ECOSOC over recent years that have had the most profound effect on marine affairs, but the working level people in the Federal structure dealing with these problems have had the greatest difficulty in even communicating with our delegation at the United Nations.

The United Nations development program, for which the United States puts up about 40 percent of the funding, has inaugurated a massive, and successful, program of fishery development on a global basis, executed by FAO. FAO policy in the United States is established by an interagency committee dominated by the Department of Agriculture, which has little or no interest or expertise in ocean affairs.

USAID ocean development activity goes on almost oblivious to these other activities by which the U.S. attempts to assist the developing nations in marine matters. The actions of the IBRD and the regional banks (Asian, African, and Latin American) now are becoming important in world fishery development, and seem to be unrelated to any U.S. activity in this field.

The world weather watch and global atmospheric research program of the World Meteorological Organization is beginning to have an ever broadening relationship with marine affairs, as it is learned that the ocean and atmosphere are really only different parts of one interconnected heat engine. Responsibility for WMO affairs in the U.S. Government lies with the Environmental Sciences Services Administration, ESSA, of the Department of Commerce.

IMCO, the Intergovernmental Maritime Consultative Organization, has its U.S. liaison with the Department of Commerce, and this is very sparingly related to anything else the U.S. Government does in the ocean affairs field, although IMCO itself is beginning to cooperate very nicely with its sister agencies, FAO, UNESCO, WMO, WHO, and IAEA, and so forth, in the international field.

NASCO, in its 1959 report, set out clearly the need for a more unifying agency in the ocean affairs field of the specialized agencies of the United Nations family. It did so again, even more clearly, in its 1967 report. Every independent advisory group studying this problem since has done so, including the International Joint Working Party of SCOR/ACMRR/WMO (A.C.) in its "Helio Caballa" report "International Ocean Affairs".

The key block to establishing a world oceanic organization has been the incoherent state of the organization of ocean affairs in the U.S.

Federal structure. Our allied nations and friends are not going to move ahead of the United States. If the U.S. prefers a chaotic organization of its ocean affairs, they think there must be some devious reason for it, that is good, and that they have not discovered yet.

One consequence is that the U.S. delegations to IOC meetings consist of a dozen to 20-odd members, among which there has been a decreasing number of scientists in recent years. Each ocean agency in the U.S. Government must have at least one representative on the U.S. delegation to protect the interest of that agency vis-a-vis the other agencies, and the Department of State must have three or four members, so each can guard his interest against other interests within the Department of State. That is not a harsh statement at all, but just flat-out truth.

MR. LENNON. It is a rather scathing indictment of our whole Government structure, and I might comment at this time that I can see how the gentleman from Virginia, who said he read your statement before you made it, complimented you the way he did, and I share his feeling 100 percent. I am ashamed to say that I have to share them, but I do.

DR. CHAPMAN. I am very sorry to have to make the statement, sir.

MR. LENNON. I am sure you must be.

Go ahead.

DR. CHAPMAN. There is no room for industry-oriented experts on the delegation. Most of the U.S. scientific representation comes from American scientists attending in other capacities, representing other entities, for there is no room for more than one or two independent scientists on a U.S. delegation any more.

It is a standing joke that the diversity of interest in a U.S. delegation is so broad that almost anything an entire U.S. delegation can agree to within itself will bring a vote of at least two-thirds of the delegations of other nations present.

There was a good deal of kidding of us at this last IOC meeting, when it was found that Italy had fielded a larger delegation than the United States had. Of course, with our hangers on, like me, outside our delegation, we still had much the largest group, every one of which was protecting his interest.

The specialized agencies, the scientific community, and even the U.S. Government took a considerable fright 2 years ago, when the General Assembly took an active interest in ocean affairs and began to move sharply on them. This increased with the formation of the Seabed Committee by the General Assembly, and the vigorous pattern of work it began to follow.

This was actually probably the best thing that ever happened toward the improvement of international cooperation in marine affairs.

The diplomats who work in the United Nations not only are not knowledgeable about ocean affairs, but, as within the U.S. Government, delegations of all nations to the United Nations are hardly accessible to ocean scientists and technologists in their own Government and national scientific communities.

Delegations to the United Nations come from Foreign Offices, and the Foreign Offices of all nations are notoriously insensitive to other branches of their own government, just as the Department of State normally is to ours.

MR. LENNON. I am so sorry the Department of State representatives left.

DR. CHAPMAN. Since I once worked for the Department of State, I am not being hypercritical. That is where I learned my diplomacy, sir. It is a good school. But all Foreign Offices work the same way. They are more sensitively tuned to each other than they are to their own nations.

Thus, all of a sudden, one had a group of very able and energetic diplomats at the General Assembly orating and adopting resolutions about ocean affairs in a very vigorous manner, on the basis of a very modest amount of knowledge about ocean problems or the ocean. They did not like what they discovered. They did not think international ocean affairs were being run very well. They did not hesitate to say so, or to start reforming them.

This threw the fear of God into the specialized agencies, and the ocean scientists and technologists, both inside and outside the national governments. It was plainly apparent that the scientists and technologists were going to lose control of ocean affairs to the diplomats if they did not stir their stumps and get organized to do their work more effectively.

There was another surge of activity to create a world oceanic organization, but this foundered as had previous ones. The specialized agencies were startled by this unwonted ocean activity in the General Assembly, but not frightened enough to be stampeded into giving up some of their empires to a new specialized agency. Hardly any agency at any level of government gets that frightened about anything.

The shock was sufficient, however, that they realized that they had to band together a little tighter for mutual protection against the United Nations mother organization, which had some eager bureaucrats itching to get control of international ocean affairs.

The upshot has been that UNESCO, FAO, WMO, and IMCO have formally agreed to coalesce behind strengthening and broadening the Intergovernmental Oceanographic Commission to help them all, and to contribute even some money and personnel to it for that purpose. IOC will still stay in UNESCO administratively, but its affairs will be jointly governed by an interagency committee.

This is strong medicine for any bureaucracy, and the international ocean bureaucracy appears to be responding to pressure and reality much more effectively than the United States ocean bureaucracy, each large element of which still thinks it has a winning hand in the United States ocean game.

If the General Assembly diplomats will just keep the pressure on for another 2 or 3 years, which I think they will do, we will end up with a tighter, more effective organization for international ocean affairs than we apparently could get in any other way. It will not be as effective or as efficient as a world oceanic agency would be, but it will be considerably better than anything we had previously.

Fortunately, the General Assembly diplomats seems to be just getting the bit in their teeth and settling down for the long grind.

Nothing better can be expected in the international ocean affairs field until the United States gets its ocean house in order through the establishment of a National Oceanic and Atmospheric Agency, or some reasonable facsimile thereof, and can set the example other na-

tions expect from a nation so huge in scientific, technological, and economic power as is the United States.

The United States has now come out well in the space race, and we began doing so the moment we put our mind to it, set up the organization to do the job, and anted up the money.

It is not doing well in the ocean race, and it will not do so until it makes up its mind to do so, organizes to do so, and puts up the money to do it. H.R. 13247 would mark a great step in that direction, and I think a vitally necessary one.

One can see the military need for the space program, and even the social need for the exhilarating discovery and adventure that it produces. I have never opposed the space program, and do not now.

The trouble is the ocean is even more important from a security standpoint, the adventure and discovery elements are equally intriguing, but people can make money out of the ocean, and not out of space. The Bureau of the Budget seems to frown on this sort of thing.

To put it bluntly, humanity and its governments are composed of two sets of people—the land people, and the sea people. The two are basically different. The sea tries out people who go upon it from all races, and casts back ashore the people it cannot tolerate.

The sea people from different races have more in common with each other intellectually, psychologically, spiritually, and socially than each has with the land people of their own race. They are a breed apart.

But the land people are the numerous sort. They control all government agencies at all levels of government, and as long as they continue to do so, the sea people will continue to be whipsawed between them. This sort of thing, bureaus of the budget in all governments like and support. They can then control things better.

In the California State government, we now have formed the new Department of Navigation and Ocean Resources, whose sole preoccupation will be the ocean and immediate coastal zone. This is a rarity. We expect it to prosper.

It can do this best if there is a sea agency in the Federal Government to match and support it, a National Oceanic and Atmospheric Agency. Who knows, if we can take that momentous step, we may even be able in time to obtain a world oceanic agency and be able to get on effectively with bending the ocean a little toward man's will, and making efficient use of its vast resources.

That is the end of my statement, sir.

(Dr. Chapman's prepared statement follows:)

STATEMENT OF W. M. CHAPMAN

My name is Wilbert McLeod Chapman. I am Director, Marine Resources, Ralston Purina Company and member of the Board of Directors, Living Marine Resources, Inc. I also act in an advisory or consulting capacity on numerous public Boards, Commissions, Panels, Working Groups, etc., concerned with marine affairs at the international, national, and state (California) level, and have done so for a good many years. My curriculum vitae, employment record, present, and recent past, connections are set out in the attached biographical sketch as of July, 1969.

I am very pleased that you have asked me to comment on H.R. 13247. I think it to be an excellent bill and one of great practical importance not only to the United States, but to the world, as I shall develop below.

The notion of consolidating the major civilian agencies concerned with marine and atmospheric affairs into a single agency in the Federal structure is not a new one. The need has been recognized on an ever broadening basis for a decade,

since the basic 1959 report of the National Academy of Sciences Committee on Oceanography (NASCO) which, in a sense, initiated the inquiry in which the Committee is engaged today. It was set out, and adopted, in legislation originating in this committee in 1961 and vetoed by the President.

The need was made evident in the Long-Range National Oceanographic Plan, "Oceanography—the Ten Years Ahead" published by the Interagency Committee on Oceanography (ICO) in 1963, and in several internal reports of ICO over the next two years.

I recommended similar legislation to this committee myself in testimony on the National Oceanographic Program Legislation in 1965 (Serial no. 89-13, pp. 407-438). Senator Muskie submitted comprehensive legislation to establish such a machinery on behalf of himself and a number of other Senators in 1965.

The need for reorganization was given a strong push by the Report of the Panel on Oceanography of the President's Science Advisory Committee in 1966 "Effective Use of the Sea," and in the 1967 report of NASCO "Oceanography 1966." Further strength has been added to the need in the three annual reports of the National Council on Marine Resources and Engineering Development in 1967, 1968 and 1969.

Finally it was recommended in essentially the form expressed in H.R. 13247 in the report "Our Nation and the Sea" of the Commission on Marine Science, Engineering and Resources, 1969. Testimony in favor of this general concept before this Committee, and in the literature on the subject, has been strong, broadly-based and copious for the past five years. In particular, broad sectors of the United States industry, the State Governments and the scientific community have proclaimed for it. Opposition has come almost entirely from within the Executive Branch of the Federal Government.

The ideas which I expressed in testimony on this subject before this Committee in 1965 were by no means original. They arose out of the scientific and government community dealing with marine affairs during the course of the broad studies which led to the NASCO 1967 report "Oceanography 1966". The ICO had done such excellent work in the short years of its existence that the nation's marine affairs had grown beyond the capabilities of that mechanism of government to move them further at the pace the nation required them to move. The reason why I presented those views to the committee in 1965, and that they were not presented then by NASCO or others associated with it, was that these views had drawn criticism from elsewhere within the Federal governmental structure and I was the one involved whose independence of position made it practical for me to present them to your committee.

The opposition in the Federal structure to such a consolidation of civilian marine affairs in 1965 came from four main sources (a) the Bureau of the Budget, (b) the Office of Science and Technology, (c) The Departments that would lose functions to the new agency, and (d) the Department of the Navy. Because of the latter there was modest opposition also within the academic scientific community, especially from those elements which drew considerable funding support from the Navy.

The Bureau of the Budget opposition was (and perhaps still is) simply that it did not wish imposed on it another large entity like NASA that would have so much Congressional support that the Bureau could not control its funding support with ease. With the civilian ocean establishment split between several Departments the Bureau could (and did, and does) control (or stifle) growth in ocean-oriented activity with considerably greater ease, on the tried and true basis of divide and conquer.

The Office of Science and Technology opposition was the effective outward one in 1964 and 1965, when that office delayed by effective lobbying the passage of the Marine Resources and Engineering Act of 1966 as long as it could, set up the Panel on Oceanography of PSAC to study the matter (an action which backfired, because the Panel convinced itself during its study of the need for a more vigorous United States ocean affairs stance), and intervened at the National Academy of Sciences by use of the Academy's Committee on Science and Public Policy (COSPUP) to delay the completion of the NASCO 1967 report until after the PSACPOO report could be published, and the National Marine Commission established.

The motive of the President's Science Advisor at that time were never quite clear, but seemed to lean in the direction of not wishing marine affairs to slip out of the grip of his office, as it would do with the erection of a National Oceanic and Atmospheric Agency. This was ridiculous parochialism because oceanography had already broadened to ocean affairs in the minds of Congress and the public,

and OST had already lost control of the action. Perhaps with a new administration and a new Science Advisor this motivation will have mitigated.

In 1965 the Departments of Government which would have lost functions to a NOAA were uniformly opposed to such a NOAA concept on strictly empire-protection grounds. Each thought it could do the job better than any new agency and, really, that it should have the whole job by itself. So far as I know that is still the vigorous position of each of the Departments affected, except that one of the Departments has changed in the interim. I predict that the Congress will simply have to walk over the top of Interior, Commerce, Transportation, and the Bureau of the Budget to form a NOAA, because each of those wants to keep all it presently has, plus getting the other fellow's part, if possible. The forces are so equally balanced in the Executive that I am not sanguine of even this rather modest bill becoming law.

The view of the Department of the Navy has seemed to be different than that of the other Departments, and more serious. Nobody involved in pushing a NOAA, or a similar agency, has ever seriously proposed taking away any Navy function to give to it, except the National Ocean Data Center, the policy control of which has been outside the Navy for some years anyway under conditions pretty satisfactory to the Navy. The Navy's opposition, or faint and damning praise, has seemed to derive from an unspoken fear that a strong NOAA would weaken the ability of the Navy to fund the specialized and general ocean research and engineering work that it required for its own particular needs. This could be a serious problem. In my view the Navy must be able to fund scientific and engineering ocean research and development on a substantial scale, of a nature not quite that required for civilian applications, if it is to fulfill its mission effectively. That is a quite general view and it might well be stated in this bill, to reassure the Navy, as was done in Senator Muskie's 1965 bill.

The one thing that has changed steadily in favor of NOAA in these recent years has been opinion at the working level in the affected Government Agencies. This is not an opinion which the Congress can get in open testimony because working level people in government cannot testify contrary to Departmental position without fear of disciplinary action. Nevertheless the working level opinion on the need for this consolidation has strengthened sharply during the past five years. The same is true of positions in the academic scientific community, although ordinarily no two scientists ever agree on precisely how such a reorganization should be done. I know of no objection to the concept of a new agency on ocean affairs in the scientific community; the backing and filling is concerned with what functions should go into it.

My view on what components should go into NOAA, and how the Congressional Committee assignments should reflect this, is also different than expressed in H.R. 13247. It still remains what I told the Committee in 1965, and as was subsequently expressed more cogently by Senator Muskie in his bill of that year.

I do not consider those differences, however, to be consequential or even very pertinent. NOAA, as expressed by the National Commission, and as incorporated in H.R. 13247, is, in my view, the most important step the Congress can take in enhancing the posture of the United States in respect of the ocean, and I support its adoption unequivocally. I find no fault with either the rationale, the analysis, or the recommendations the Commission made in this aspect of its work.

The elements included in NOAA by the Commission's recommendations, and in H.R. 13247, encompass the key agencies and functions required to provide a viable and desirable core to which other activities could be added from time to time if further consideration showed such additions to have merit. I think, myself, that the merchant marine functions of government, at least, should be added to NOAA, and as soon as politics permit. I am surprised that the maritime unions are not demanding this action, and expect that in due course they will.

I am aware that large sections of the Federal structure are under serious study from the standpoint of reorganization, and I am sure that the whole structure would benefit from substantial stirring up and modernization. This, however, will take time and we are already so delayed in getting a suitable Federal ocean structure that I do not believe we can safely wait longer. I view this urgency not only from the national, but from the state and international viewpoints.

In the State of California I am Chairman of the California Advisory Commission on Marine and Coastal Resources. Our main problems are connected with the Coastal Zone. Population, industry, and all social and economic forces in California concentrate steadily and intensively on the interface between land and water. With each month those pressures become more critical within the

band a few miles to sea and a few miles inland from that interface. We are getting our State activities into fairly good order, and in this are perhaps somewhat more fortunate than some of our sister states. Progress at our State level has been particularly good during this year, and we now seem to have a good momentum up.

But we must deal with such a diversity of agencies in the Federal structure that it makes our State work all the more difficult. At the State level we very badly need a strong ocean oriented agency in the civilian area that can help us with our problems, instead of a clutch of diverse agencies who at times seem to be more trouble than they are worth simply because one needs to spend most of one's time in liaison and communication with them rather than all hands getting on with the necessary work.

I believe that almost everyone professionally acquainted with ocean matters agrees with me that the most urgent problems the nation has with the ocean are those centering in the coastal zone, a few miles either side of the interface between sea and land. Here are the estuarine, pollution, multiple-use, aesthetic, industrial, recreation, social and economic problems so complex, difficult, and interdigitating as to try the patience of Job and the wisdom of Solomon. I believe, also, that most believe these can only be dealt with effectively at the local level. At least that is my experience. To do this effectively the State people must have the help of a strong and coherent Federal entity such as NOAA.

For several years I have been Vice-Chairman of the Advisory Committee on Marine Resources Research of the Food and Agricultural Organization of the United Nations. ACMRR advises the Director General of FAO on the activities of its Fisheries Department and has the separate additional duty of being one of the two official advisory bodies of the Intergovernmental Oceanographic Commission of UNESCO. ACMRR works very closely with the other advisory body of IOC, the Scientific Committee on Ocean Research (SCOR) of the International Council of Scientific Unions (ICSU), and over recent years with appropriate advisory groups from the World Meteorological Organization (WMO). In these connections we have also had advisory relations with the Secretary General of the United Nations in his responses to various ocean initiatives that have arisen in the General Assembly of the United Nations over the past few years. I have just returned from ACMRR and IOC meetings in Paris.

From this international viewpoint, where I and my colleagues work in our capacities as independent experts from the scientific community and not as representatives of the United States Government, the policies and postures of the United States Government appear at times almost incredible.

The Department of State has undertaken repeated initiatives through the General Assembly and ECOSOC over recent years that have had the most profound effect on marine affairs, but the working level people in the Federal structure dealing with these problems have the greatest difficulty in even communicating with our delegation at the United Nations.

The United Nations Development Program (for which the United States provides 40% funding) has inaugurated a massive (and successful) program of fishery development on a global basis executed by FAO. FAO policy in the United States is established by an inter-agency committee dominated by the Department of Agriculture, which has little or no interest or expertise in ocean affairs. USAID ocean development activity goes on almost oblivious to these other activities by which the United States attempts to assist the developing nations. The actions of the IBRD and the regional banks, now becoming important in world fishery development, seem to be unrelated to any United States activity in this field.

The World Weather Watch and Global Atmospheric Research Program of the World Meteorological Organization is beginning to have an ever broadening relationship with marine affairs as it is learned that the ocean and atmosphere are different parts of one interconnected heat engine. Responsibility for WMO affairs in the United States Government lies with the Environmental Sciences Services Administration (ESSA) of the Department of Commerce.

IMCO, the Intergovernmental Maritime Consultative Organization, has its United States liaison with the Department of Commerce and this is very sparingly related to anything else the United States does in the ocean affairs field, although IMCO itself is beginning to cooperate very nicely with its sister agencies (FAO, UNESCO, WMO, WHO, and IAEA) in the international field.

NASCO, in its 1959 Report, set out clearly the need for a more unifying agency in the ocean affairs field of the specialized agencies of the United Nations family.

It did so again in its 1967 report. Every independent advisory group studying this problem since has done so, including the Joint Working Party of SCOR/ACMRR/WMO (A.C.) in its "Helio Caballa" report "International Ocean Affairs".

The key block to establishing a World Oceanic Organization has been the incoherent state of the organization of ocean affairs in the United States Federal structure. Our allied nations and friends are not going to move ahead of the United States. If the United States prefers a chaotic organization of its ocean affairs they think there must be some reason for it that is good and that they haven't discovered yet.

One consequence is that the United States delegations to Intergovernmental Oceanographic Commission meetings consist of a dozen to 20-odd members, among which there has been a decreasing number of scientists in recent years. Each ocean agency in the United States Government must have at least one representative on the U.S. delegation to protect its interest vis-a-vis the other agencies, and the Department of State must have three or four members so each can guard his interest against other interests within the Department of State. There is no room for industry-oriented experts on the delegation. Most of the United States scientific representation comes from American Scientists attending in other capacities, representing other entities, for there is no room for more than one or two scientists on a U.S. delegation any more. It is a standing joke that the diversity of interest in a U.S. delegation is so broad that almost anything an entire U.S. delegation can agree to within itself will bring a vote of two-thirds of the delegations of other nations present. There was a good deal of kidding of us at this last IOC meeting when it was found that Italy had fielded a larger delegation than the United States had. Of course with our hangers on outside our delegation (of which I was one) we had much the largest group, every one of which was protecting his interest.

The specialized agencies, the scientific community, and even the United States Government took a considerable fright two years ago when the General Assembly took an active interest in ocean affairs and began to move sharply on them. This increased with the formation of the Seabed Committee by the General Assembly, and the vigorous pattern of work it began to follow.

This was probably the best thing that ever happened toward the improvement of international cooperation in marine affairs. The diplomats who work in the United Nations not only are not knowledgeable about ocean affairs but, as with the United States, delegations to the United Nations, are hardly accessible to ocean scientists and technologists in their own government and national scientific communities. Delegations to the United Nations come from Foreign Offices, and the Foreign Offices of all nations are notoriously insensitive to other branches of their own government, just as the Department of State is in ours.

Thus, all of a sudden, one had a group of very able and energetic diplomats at the General Assembly orating and adopting resolutions about ocean affairs in a very vigorous manner on the basis of a very modest amount of knowledge about ocean problems or the ocean. They did not like what they discovered. They did not think international ocean affairs were being run very well. They did not hesitate to say so, or to start reforming them.

This threw the fear of God into the specialized agencies, and the ocean scientists and technologists both inside and outside the national governments. It was plainly apparent that the scientists and technologists were going to lose control of ocean affairs to the diplomats if they did not stir their stumps and get organized to do their work more effectively.

There was another surge of activity to create a World Oceanic Organization, but this foundered as had previous ones. The specialized agencies were startled by this unwonted ocean activity in the General Assembly, but not frightened enough to be stampeded into giving up some of their empires to a new specialized agency. Hardly any agency at any level of any government gets that frightened about anything.

The shock was sufficient, however, that they realized they had to band together a little tighter for mutual protection against the United Nations mother organization, which had some eager bureaucrats itching to get control of international ocean affairs. The upshot has been that UNESCO, FAO, WMO, and IMCO have formally agreed to coalesce behind strengthening and broadening the IOC to help them all, and to contribute even some money and personnel to it for that purpose. IOC will still stay in UNESCO administratively but its affairs will be jointly governed by an inter-agency committee.

This is strong medicine for any bureaucracy, and the international ocean bureaucracy appears to be responding to pressure and reality much more effec-

tively than the United States ocean bureaucracy, each large element of which still thinks it has a winning hand in the United States ocean game. If the General Assembly diplomats will just keep the pressure on for another two or three years we will end up with a tighter, more effective organization for international ocean affairs than we apparently could get in any other way. It will not be as effective or as efficient as a World Oceanic Agency would be, but it will be considerably better than anything we had. Fortunately the General Assembly diplomats seem to be just getting the bit in their teeth and settling down for the long grind.

Nothing better can be expected in the international ocean affairs field until the United States gets its ocean house in order through the establishment of a National Oceanic and Atmospheric Agency, or some reasonable facsimile thereof, and can set the example other nations expect from a nation so huge in scientific, technological and economic power as is the United States. The United States has now come out well in the space race and we began doing so the moment we put our mind to it, set up the organization to do the job, and anted up the money. It is not doing well in the ocean race and it will not do so until it makes up its mind to do so, organizes to do so, and puts up the money to do it. H.R. 13247 would mark a great step in that direction, and I think a vitally necessary one.

One can see the military need for the space program, and even the social need for exhilarating discovery and adventure. I have never opposed the space program. The trouble is that the ocean is even more important from a security standpoint, the adventure and discovery elements are equally intriguing, but people can make money out of the ocean and not out of space. The Bureau of the Budget seems to frown on this sort of thing.

To put it bluntly, humanity and its governments are composed of two sets of people—the land people and the sea people. The two are basically different. The sea tries out people who go upon it from all races and casts back ashore the people it cannot tolerate. The sea people from different races have more in common with each other intellectually, psychologically, spiritually, and socially than each has with the land people of their own race. They are a breed apart.

But the land people are the numerous sort. They control all government agencies at all levels of government and as long as they continue to do so the sea people will continue to be whipsawed between them. This sort of thing Bureau of the Budget like and support. They can then control better.

In the California State Government within the month we will finally have one Department, the new Department of Navigation and Ocean Resources, whose sole preoccupation will be the ocean and immediate coastal zone. This is a rarity. We expect it to prosper. It can do this best if there is a sea agency in the Federal Government to match and support it, a National Oceanic and Atmospheric Agency. Who knows, if we can take that momentous step we may even be able in time to obtain a World Oceanic Agency and be able to get on effectively with bending the ocean a little toward man's will, and making efficient use of its vast resources.

Mr. LENNON. Thank you very much, Dr. Chapman.

My only regret is that every single member of the Subcommittee on Oceanography could not have been here to hear your challenging remarks.

Mr. Karth, do you have any questions?

Mr. KARTH. I have no questions, Mr. Chairman. I think that any I might have had have been answered by this very precise statement.

My additional regret to yours is that certain other committee chairmen, and subcommittee chairmen, were not here to listen to this.

We have a little infrastructure problem within the Congress, too, sir. I congratulate you for your statement.

Mr. LENNON. The gentleman from North Carolina, Mr. Jones.

Mr. JONES. Mr. Chairman, I apologize for getting here late. I think it is my loss to have not heard the gentleman.

I want to commend the gentleman on the very forthright manner in which he presented this, and particularly on his choice of words.

Dr. CHAPMAN. Thank you.

Mr. LENNON. My distinguished friend from Ohio, Mr. Feighan.

Mr. FEIGHAN. Thank you, Mr. Chairman.

My presence at another subcommittee enabled me to be here only for the second portion of your prepared statement, and I want to tell you that I was very gratified to be here for that very short period of time, and I am going to read the entire statement.

And I want to congratulate you for your absolute honesty and integrity and forthrightness, which I think is something that we need not only in Congress, but everywhere in this country.

Thank you.

Dr. CHAPMAN. Thank you, sir.

Mr. LENNON. Thank you, sir.

Dr. Chapman, how many copies of this statement did you furnish the committee?

Dr. CHAPMAN. I furnished one, and Professor Clingan was kind enough this morning to run off a larger bunch, and I think that now counsel has all of them except one or two.

Mr. LENNON. And you could run off more, if you had to?

Mr. CLINGAN. Yes, sir.

Mr. LENNON. Let me request you to send a copy of this statement to each member of the subcommittee, with a letter of transmittal, to be signed by me, in which I state that this was one of the most challenging and effective statements that we have been privileged to hear since we started these hearings. As a personal favor I want each member to read it in its entirety, and to respond to me in writing that they have read it in its entirety.

Dr. CHAPMAN. Sir, you know, this response from the committee is very gratifying, but it is also defeating. I thought I would stir up some controversy, and they would ask me a lot of questions. I am loaded with answers.

Mr. LENNON. We have not gotten to that yet.

Dr. CHAPMAN. I see.

Mr. LENNON. In addition, counsel, I want you to send to the Director of the Bureau of the Budget, and to the Vice President, and to the Secretary of Commerce, the Secretary of Transportation, the Secretary of the Interior, and any other agency of the Federal Government that might be affected to any degree by the structure, such as in NOAA, a copy of this statement, over my signature, in a letter of transmittal in which I request that they respond to me in writing that they have read this statement, and asking for their comments, and telling them that is the least that I expect they can do, out of courtesy to this committee and the Congress.

Mr. KARTH. Mr. Chairman, may I suggest the President's Science Adviser, also?

Mr. LENNON. And to Dr. DuBridge.

Mr. JONES. Mr. Chairman, I suggest HEW.

Mr. LENNON. The Chairman of the so-called Ash Commission. Has anybody any other suggestions?

Mr. JONES. I think HEW should receive one.

Mr. LENNON. And also the head of the National Science Foundation, and just say that I expect them to read it and give me their comments, and I want a flat statement that they have read it in its entirety, and will not accept less.

If you come up with any other individual that it ought to be sent to, do so.

MR. CLINGAN. Yes, sir.

MR. LENNON. I find so little to question, here. It is difficult for me to question a person that I find myself in such total agreement with.

DR. CHAPMAN. I will tell you what my difficulty is. I thought you would probably question me on "The Ocean Regime of the Real World," which I ask might be included for the record.

MR. LENNON. Yes, sir.

Without objection, your full statement, although you covered it almost completely, will be inserted in the record following your summary of the same, and the other paper that you have prepared is what, Dr. Chapman?

DR. CHAPMAN. "The Ocean Regime of the Real World," and a paper entitled "Toward a More Effective Use of Food from the Sea by the United States and Man."

Since I am really a fisheries expert, I ought to say something about fisheries.

MR. LENNON. That should be included in the record, and inasmuch as you referred to the Department of Agriculture, send a copy to the Secretary of Agriculture, with the same request, and to the Secretary of State, with the same request.

DR. CHAPMAN. You will fix me up real good.

MR. LENNON. I was coming to that.

I will think of others to whom this statement should be sent, with the insistence that they read it in its entirety, and when they respond say that they have personally read it. Suggest to them that if we don't hear from them within a period of 10 days that I shall go on the floor of the House and make known to all the Members of Congress that these people that this communication has been sent to do not have the time or the interest or the concern sufficient to respond to the letter. That will be an indictment of their lack of cooperation and understanding.

Are there any other questions you want to tell me?

DR. CHAPMAN. No, sir.

You have honored me greatly, sir.

MR. LENNON. I would much rather have somebody tell me a question than ask me one. I don't know how else to comment on what you said.

This is the sort of testimony that I think we can effectively use to generate the interest that we ought to have.

I anticipate that we are going to have the problem that you have indicated already with respect to the administration again. As a matter of fact, I have a luncheon engagement today where I am supposed to get the word about the administration with respect to what its position will be. I have a feeling that it will not be what I had hoped.

Let's include Dr. Wenk in this, too. Let us include the Secretary of the Navy in this, too.

DR. CHAPMAN. If there are any reactions that come from your distribution of this that you think I might be able to help with, Professor Clingan may get ahold of me, and I will be most happy to help.

MR. LENNON. We might ask you to draft a letter in response to the responses that we get. I think that you can do it very effectively.

A little over 2 years ago, now, I requested the Governor of North Carolina, where the legislature was not then in session, to establish a Marine Science Council in North Carolina to coordinate the marine science activities, and I requested the members of this subcommittee to in turn request their respective Governors, if they were coastal or lake States, to establish such a Marine Science Council, comparable, hopefully, to what you have done in California.

Incidentally, you know that the distinguished gentleman that you referred to a few minutes ago, Lt. Governor Ed Reinecke, is a former very active member of this subcommittee.

Dr. CHAPMAN. He is a distinguished graduate of your excellent school who is doing us much good in California.

Mr. LENNON. And he is a fine gentleman.

The Governor responded to that, and I do know that the Governors of some of the other States have responded to the request of the membership of this committee to do the same thing.

Subsequently, when the legislature of our State convened, I asked that it be made a statutory body, and it is now a statutory body, as a result of the action of the last session of the General Assembly of North Carolina, and it has been very effective, in my judgment, at least, in the short time it has been a statutory body, in coordinating the activities of private individuals as well as the universities and coastal zone areas.

Another thought comes to me, Mr. Counsel. In connection with the convening here on 28 and 29 October, as you may know about, we have invited the Governors of some 30 States to send their representatives here for a two-day conference, to explore how we can do what you suggested, maintain the integrity of the State or local level with respect to the coastal zones, but at the same time provide the Federal leadership which we recognize must be a part of this whole picture.

If you could find time, Mr. Counsel, I would like for the statement of the gentleman, Dr. Chapman, to be read at this symposium that is going to be here on the 28th and 29th of October, that this committee is sponsoring.

Would you object to this?

Dr. CHAPMAN. I would not. Thank you.

Mr. JONES. Mr. Chairman, would you yield?

Mr. LENNON. I will yield.

Mr. JONES. If Dr. Chapman can make himself available, I suggest that we let him read his own statement.

Mr. LENNON. If Dr. Chapman can be here on either of those days, we would find time to inject you into the program.

Even though the program has already been set up for speakers and moderators, I am sure that we can find time for you to read this statement.

Dr. CHAPMAN. We have made provision for our staff men from our California Council and Commission to be here. I am a little squeezed for time, but suppose I talk with Professor Clingan and see what we can work out.

Mr. LENNON. All right, sir. If you cannot, you designate someone to do it. It will not take more than 15 or 20 minutes, but I think it ought to be read. I think it will be a challenge, particularly as related to the coastal zone problem that we are trying to explore.

Going back to the recommendations that were made earlier, I will ask counsel to go back and take the Muskie bill and take the other bill that was considered by this subcommittee back in the 89th Congress, I believe, and see in what particular we could add to or consider the bill that we have now as a vehicle to consider some of these other recommendations that were incorporated in the Muskie bill, and the other bill considered by this subcommittee several years ago.

I asked this question the other day of some of the Government witnesses who were here. I called their attention to this legislation and asked them where would we be today, if Congress had enacted and the President had signed into law this legislation that was proposed several years ago. They had to admit that likely we would be further advanced than we are now.

Dr. CHAPMAN. You know, the thing I have not much noted this morning, Mr. Chairman, is that I feel very intensely about the competition between ourselves and Russia on the use of the seas, and I think you could extend that to say that had we taken the action in 1965, we would at least be pulling even with Russia, and we surely are not doing so now. They are moving lots faster than we are in marine affairs.

Mr. LENNON. Yes, sir.

As a matter of fact, we had comparable legislation to this in 1961, considered by the committee.

Dr. CHAPMAN. There is nothing original about it. It is just hard to put across.

Mr. LENNON. It is just a rehash of everything that has happened over the years, so that we come back to that same basic problem of—

Dr. CHAPMAN. Empire protection is what you come back to.

Mr. LENNON. That is a genteel way of putting it, but it is the proper way of putting it.

Counsel, do you have any questions?

Mr. CLINGAN. No, sir.

Mr. LENNON. Do you have any questions?

Mr. JONES. No questions, Mr. Chairman.

Mr. LENNON. If you find time to carry out my request in this respect, the harsher you make that letter, the more delighted I will be to sign it.

Thank you very much, sir. We appreciate your coming.

Dr. CHAPMAN. Thank you, sir.

I will leave these two documents here.

Mr. LENNON. Thank you, sir.

(Reports, "Toward a More Effective Use of Food from the Sea by the United States and Man," and "The Ocean Regime of the Real World," to be furnished, follow:)

TOWARD A MORE EFFECTIVE USE OF FOOD FROM THE SEA BY THE UNITED STATES AND MAN

(Wilbert McLeod Chapman, Ralston Purina Co.)

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RECOMMENDATIONS

1. *Major civilian agencies dealing with aspects of ocean affairs of the U.S. Government should be grouped together in one Department of the Ocean.*

This should include, at least, the National Ocean Data Center, National Ocean Instrumentation Center, Environmental Science Services Administration, Bureau of Commercial Fisheries, fisheries section of Bureau of Sport Fisheries and Wildlife, and United States Coast Guard.

2. *The U.S. Government should seek the prompt establishment of a central inter-governmental oceanic organization within the United Nations family authorized and equipped to deal with all international aspects of ocean investigations and the uses of the sea.*

This should include, at least, the Intergovernmental Oceanographic Commission of UNESCO, the Department of Fisheries and Committee on Fisheries of FAO, the International Hydrographic Bureau, the marine activities of the World Meteorological Organization, the Intergovernmental Maritime Consultative Commission, and the marine activities of the Research and Transportation Division of ECOSOC.

3. *There should be formed within the Department of State an Office of Special Assistant to the Secretary for Ocean Affairs which would have lead responsibility for attending to the diplomatic aspects of the U.S. Government's international ocean affairs.*

This office should be formed upon the nucleus of the present Office for Special Assistant to the Secretary for Fisheries and Wildlife with the functions and purview of the new office being broadened to include all international aspects of ocean affairs in which the United States is involved.

4. *Within the new Department of the Ocean there should be established as an agency, bureau or other entity, the Federal fishery function which would have lead agency responsibility for all Federal activities related to fishery science, development, trade, management, technology, engineering, and administration.*

The Federal Fishery Function should include the functions and personnel presently in the Bureau of Commercial Fisheries and the fisheries section of the Bureau of Sport Fisheries and Wildlife of the Department of the Interior.

5. *The Federal fishery function should operate within the terms of a policy adopted by the Congress setting out criteria under which the use of living aquatic resources would be managed and developed to provide for rational multiple use, and particularly for recreational and commercial purposes.*

A suggested formula for such a policy is set out on page 57.

6. *The Federal fisheries function should have lead agency responsibility in all technical aspects of international fishery activities of the United States.*

Such responsibility should include the Food from the Sea program; bilateral fishery technical assistance; activities of the United Nations and its specialized agencies involving fisheries; budgetary support for United States participation in International Fisheries Commissions; activities of regional international agencies involving fisheries; activity with international credit agencies involving fisheries; and be as responsible and responsive to United States fishing industry activity in the foreign as in the domestic field. It should follow and promote the technical fisheries interests of the United States as freely and actively in the external as in the internal field.

7. *The Federal fishery function should have established by new law clear authority and responsibility for the management of the use of living aquatic resources within the jurisdiction of the United States in accordance with the policy set out in recommendation*

While it is appropriate to continue handling fishery management on as local a level as practical, both the development and conservation of living resources must be conducted in the national, rather than the local, interest and clear responsibility for doing this must be lodged at the Federal Government level.

8. *The Federal fishery function should concentrate its domestic activities at least for the next decade on increasing the production of fish and shellfish by U.S.-flag vessels, primarily from the underutilized resources of the U.S. Continental Shelf and slope regions*

General goals should be established which the Congress and others could keep in mind as objectives to be met. These should be to double production by U.S. flag vessels within the next decade, and to quadruple it by 2000.

9. *The Federal fishery function should broaden and strengthen vigorously its entire program (resource assessment, exploratory fishing, gear development, processing technology, economic research, etc.) aimed at bringing to harvest the very abundant organisms of lower trophic level and smaller size that can be caught in bulk cheaply and manufactured into fish meal, fish oil, fish solubles, fish protein concentrates, and other low cost, high nutritive value protein and other products*

The most abundant underutilized resources in United States coastal waters, and in the world ocean, are these small, densely schooling, lower trophic level animals. The largest demand for fish in the United States and in the world is in the form of fish meal. This is likely to change into demand for fish protein concentrate for direct human consumption if processing and distribution problems with such products can be solved. Making these enormous resources useful for man is one of the most important contributions the United States could make to the harvest of the sea, both for itself and the world in general.

10. *The Federal fishery function should be provided with funds and authority to mount a concentrated drive for a 10-year period to building the ground fish fisheries of the United States*

This program should include for this period of time authority to provide vessel construction subsidies and other supports fully equivalent to Canadian supports in these fields.

11. *The Federal fishery function should be provided with authority to give tax incentives, under appropriate criteria, to particular U.S.-flag fisheries which it is wished to develop*

No general incentive would more quickly stimulate production by U.S. flag fishing vessels than appropriate modification of the industry's tax base along the line of the depletion allowance granted petroleum producers, and land taxes granted farmers.

12. *The fishermen's loan and vessel mortgage insurance programs should have sufficient level of funds authorized to meet all demands upon them*

These two programs have been very useful to the fishing industry at nominal cost to the government, and little adverse comment from the private banking business. Vessel operators steadily need better access to capital than private business can make available on suitable terms.

13. *The Federal fishery function should have a line item in its budget devoted to the support by it of academic research on fishery problems, both in the natural sciences and the social sciences, through grants and contracts, using the normal procedures of having such proposals reviewed by a committee of peers*

This procedure, so valuable to NASSA, NSF, Navy, AEC, and other government agencies has been very lightly used in fisheries for a variety of reasons that need correction.

14. *The Federal fishery function should strengthen materially its support of developing the production of fish and shellfish for direct consumption by aquaculture. In particular attention should be given to the elimination of institutional barriers preventing the economic production of shellfish, salmon and sea-run trout by private enterprise*

In particular, experiments should be conducted to apply existing knowledge, technology, and private business methods to the production of Pacific salmon and sea-run trout for commercial private purposes by experimentation with runs in small coastal streams entirely on land within Federal control.

15. *The Federal fishery function should particularly strengthen materially its economic research and statistical reporting capabilities*

There is hardly any aspect of the federal fishery function so weak and so badly needed as its economic research and statistical reporting capabilities.

16. *The Federal fishery function should pursue a vigorous policy of exploring, assessing the extent and establishing the commercial and recreational possibilities of harvesting, of the particular living resource on the Continental Shelf and slope adjacent to the United States, or available to harvest by citizens of the United States on the high seas*

The previous system of dividing the fishery work into technology and biology research has been long out moded but not yet discarded. The Federal Fishery Function needs to attack problems before it by a systems approach using whatever scientific and technical skills the solution to that particular problem needs in a proper mix suited to yielding results, not "in-house" happiness over bureaucratic support.

17. *The Federal fishery function must play a much strengthened role in dealing with the estuarine problems of the Nation*

The marine aquaculture program must depend largely on the estuarine area for its production, and much world living resource production is also dependent upon this area. If it cannot be kept free enough from pollution, silting, and ecological damage to support the animals forming these resources great damage will be done the living aquatic resource base of the nation.

18. *The Federal fishery function, in consultation with the sea-grant college program, should establish an effective mechanism for getting the results of science and technology into the hands of the fisherman in timely fashion and in forms useful to him*

CONCLUSIONS

1. The production of fish and shellfish from the world ocean, excluding whales, has approximately tripled from 1948 through 1966, coming from about 18 million short tons to 53 million short tons (FAO Statistics). Production has continued to increase for the past two years at about the same rate, but full statistics are not yet available. Total world fish and shellfish production from all waters was 64 million metric tons in 1968 (FAO).

2. There is every reason to think that the world market for fish and shellfish will continue to increase at about the same rate (about triple the rate of human population increase) for the foreseeable future because of the steadily increasing demand for high-grade animal protein with increasing affluence, and the pent up demand in the developing world.

3. There is reasonable consensus among world experts that known reserves of underutilized resources of the kinds now harvested will permit, on a conservative estimate basis, a world-wide production of 200-250 million tons per year on a sustainable basis, given rational management of individual resources by appropriate regulation of fishing effort on them. Thus a continued increase of production to a sustainable level 4 to 5 times that presently is had is attainable from known resources of the kinds now used.

4. If technology is improved to harvest economically smaller sized animals (in the range of 1 to 5 inches total length) added reserves can be in the range of 1,000 to 2,000 million tons per year from wild stock. Additional substantial food can be produced from aquaculture, which is already extensively practiced with certain kelps, shellfish and fish.

5. The total value of fish and shellfish production in the world was reckoned by FAO to have been \$9 billion in 1966 of which about \$7.5 billion came from the ocean. This is considerably more value than the production of all minerals from marine sources (petroleum, gas, and others) which was perhaps as much as \$5 billion in 1966, most of which was fossil fuels. It will be a good many years before the value of petroleum and other minerals produced from marine sources equals the value of fish and shellfish harvested from the world ocean.

6. The production of fish and shellfish by United States flag vessels was a little more than 2 million short tons in 1967 (BCF statistics). It had been that high in 1934 and in that 33 years has never exceeded 2.7 million tons (1962).

7. The use of fish and shellfish in the United States has increased from 2.9 million short tons (round weight) in 1948 to 7.1 million tons in 1967. The United States has thus become one of the largest users of fish and shellfish in the world. Having 6% of the world's population it used more than 12% of the world's production of fish and shellfish. Both total and per capita consumption are rising, have been for twenty years, and there is no sign of leveling off. Present per capita consumption at 70 pounds per year in 1967 is one of the higher in the world, and rate of use in 1968 is above that of 1967.

8. Known resources adjacent to the coast of the United States are capable of yielding about 22 million tons per year on a sustainable yield basis, and the United States thus has the largest underutilized marine food resources in the northern hemisphere directly off its coast. It is this which has attracted fourteen countries of Europe and Asia to fishing off the coast of the United States with substantial internal political, and external diplomatic interaction.

9. Thus the production of coastal fishery resources of the United States can be expanded, on the basis of sustainable yield, by a factor of 10 from the level produced by U.S. flag vessels over the past 30 years, and currently they are capable of producing annually 3 times the amount now used by the United States; and market for the production is available in the United States. The projected domestic market for fish and shellfish in the United States for the year 2000 (Marine Science Affairs, 1968 p. 38) is about 15 million short tons per year, which is 6-7 times the present level of production by U.S. flag vessels, but well within the ability of known resources adjacent to the United States to produce.

10. The difference between use of fish and shellfish in the United States and production by U.S. flag vessels has been met by steadily increasing imports. In terms of round weight the proportion of fishery products used in the United States that arose from imports has risen from 20% in 1948 to 71.4% in 1967. It is running higher in 1968 than in 1967.

11. Substantially all of the imports of fishery products into the United States has been imported and marketed, by U.S. fish firms, who have added more or less processing to the imports after arrival and before marketing. For instance, tuna is imported frozen and canned in the United States; shrimp are imported largely in the frozen green headless form and further processed before marketing; frozen fish are largely imported as blocks of frozen fillets which are further processed before distribution; etc. The value of added processing in the United States exceeded \$1 billion in 1966.

12. United States fish firms have set up extensive collecting networks for fishery raw material or semi-processed products on a world-wide basis extending through more than 30 countries, primarily in the developing world. This has been accomplished through a variety of methods; wholly owned fishing and processing firms in those countries; joint ventures either with local entrepreneurs or firms in other fishing countries; the provision of risk capital for vessel or plant construction to local entrepreneurs; the provision of technical assistance for transfer of technology and quality control; the provision of guaranteed market to local entrepreneurs; etc.

13. One consequence of this has been that U.S. fish firms have been, and are, a substantial factor in the development of the fisheries of the developing world. This has led not only to exports to the United States, but the building of exports to other countries as well both in the industrialized and developing world. It has also led to increased use of fishery products in the country where the development took place.

14. A second consequence has been an increase in the taxable earnings of U.S. fish firms to a degree not reflected in the statistics of catch of U.S. flag vessels.

15. A third consequence has been a growing dichotomy within the U.S. fish business between the processors and distributors on the one hand, whose business has grown and thrived during the post World War II period both foreign and domestically, and the domestic fisherman and vessel owner whose volume of production has been stagnant for 30 years and whose general earnings have been unsatisfactory in comparison with other United States industry.

16. The rapid increase in use of fishery products in the United States has been in terms of both volume and value. In 1967 the value of the catch to U.S. fishermen was \$438 million; the declared value of imports was \$686 million; the value at the processor level in the United States was \$1,193 million; the value in the United States at the wholesale level was \$2,151; and the retail value of fishery products sold in the United States was \$2,578 million. Nearly half of the latter values (\$1,220 million) arose from imports. (BCF statistics.)

17. Four classes of products comprised nearly 80% (in round weight terms) of the fishery products used in the United States in 1967 (fish meal and solubles, frozen fish, tuna, and shrimp). Each of these main classes of products (all growing steadily in usage) represent varying problems with relation to capability of being supported by coastal United States resources.

18. Fish meal is overwhelmingly the largest, using about 64% of the round weight equivalent of fish consumed in the United States in 1967. 81.6% of this was imported. This is the product for which very large resources exist in coastal

U.S. waters (thread herring, anchovy and various other fish in the Gulf of Mexico and Southeastern states; anchovy and other fish off southern California).

19. The lack of growth in total production of fish and shellfish by U.S. flag vessels for the past 35 years is a statistical non-sequitur covering over an exceedingly complex and dynamic industry whose parts have varied greatly in productivity and from a variety of causes. Fifteen of the major fisheries are reviewed in some detail.

20. While the fish trade, composed of processors, distributors and brokers have thrived and require no further governmental attention than other manufacturing and marketing industries, the highly diverse fishing end of the business requires the same sort of preferential treatment given other primary producers (such as petroleum and farmers) in order to thrive. It has not had this and this is why it has not thrived. A number of specific problems are described and remedies recommended.

21. In general the production of food and other commodities from living aquatic resources, especially from the ocean, has not been supported by the United States Government. This is the reason why United States production of food from the sea has slipped from second to sixth place in the world since the end of World War II, at the same time consumption of fish by the United States has been increased sharply, and large resources off the continental United States have gone unused.

CHAPTER I—U.S. OCEAN POLICY AND ITS FLAG FISHERIES

Policy of the United States in respect of ocean fishing by vessels wearing its flag must be an integral part of the general policy and strategy of the United States, and particularly that for the total use of the ocean.

Organic materials provide the sinews of the society—its food and much of its clothing, fiber, energy, drugs, shelter, and a great deal more. Organic matter comes from living things. They are used from three sources: things that grow on land (agriculture and forestry); things that have grown on the land and in the sea and have been fossilized in deposits (petroleum, natural gas, coal, oil shale and tar sand); and the living resources of the sea.

The living resources of the land and sea are renewable resources which, if properly husbanded and harvested, will provide crops indefinitely, and if properly bred and nurtured can bring forward crops larger and more varied than nature originally provided.

Selective breeding, fertilization and husbandry have increased crops from particular areas and resources on land prodigiously in recent generations, and the main barrier to further increase is the amount of solar energy that falls on the land and can be stored by plants in the alchemy of their growth. This process of selective breeding, fertilization and husbandry has barely begun with the living resources of the sea, which are naturally more abundant than those of the land because more solar energy strikes the sea than does the land, living matter thrives in the sea to depths of tens of meters instead of tens of inches as it does on land, and the fertilizers it requires are much more abundant and all pervasive in the sea than on the land.

Because of its sophistication, high rate of economic activity, and affluence United States society uses all of these organic materials from all of these sources at rate levels substantially higher than does any other society, and there is no indication that this rate of increased use will do anything but continue to increase for the foreseeable future. The disproportionately high use by United States society, in relation to the rest of the world, of energy and chemicals from fossil fuels and of food, fiber, wool and drugs from agriculture and forestry is well known. It is not so well realized that the United States, with about 6% of the world's population, uses about 13% of the total world production of fish and shellfish, that its per capita use of these products at about 70 pounds per year is one of the highest of any country in the world, that this high absolute and per capita use of ocean food products has been increasing sharply and steadily since the end of World War II, and gives every sign of continuing to do so.

It is obvious that United States policy must promote access by its society to all of these sources of organics in the abundance, stability of supply, and cheapness of cost that will best strengthen the posture of the nation. It has long been bipartisan policy of the United States to increase the abundance, stability of supply, and cheapness of cost of these commodities to other societies in the world, well recognizing that social unrest and its final outburst as war, can most practically be restrained by ease of access, lack of imbalance, and cheapness of cost of food, fibers, fuel, shelter, and drugs.

The promotion of agriculture and forestry has been a prime activity of government since the foundation of the republic and before. Beginning a hundred years and more ago the promotion of such use of the land by the homestead acts, the land grant college act, and the provision of many other incentives to settlers, permitted the settlement of the west. The whole matter of improving agricultural production was much stimulated by heavily increased selective subsidies, expanded research, support prices, and many other incentives to the farmer since about 1932. The total Federal contribution to this effort is epitomized by the appropriations to the Department of Agriculture which have been in excess of \$7 billion per year in recent years. The individual State of the Union provide other large funds to these purposes. The budget of the U.S. Bureau of Commercial Fisheries runs at only about \$50 million a year.

Despite all of the outcries about cost, subsidies, and special benefits to agriculture it is obvious that the worth of these activities to the nation has been much greater than their cost. The percentage of income which the United States citizen pays for food is less than that in any other country, and the least in history. The United States can be, and has been (under extremity), the granary of the world and the food support of its allies. The agricultural technology it has thus developed is being transferred steadily to other parts of the world to relieve hunger, want and disease. The contribution of this to the posture of the United States and the welfare of itself and the world has been out of all proportion to its cost.

Similarly great incentives have been provided to the fossil fuel industries by the Government, and this has been particularly true of the petroleum industry for many years. The 27½ tax depletion allowance has provided enormous incentive to development of these resources on a world-wide basis, and this has been expanded by import controls (as with agriculture), close integration with both foreign and domestic policy, and the ability to combine and act together in certain situations in manners not permitted other entrepreneurs.

Again there have been continuous outcries about the cost of this, and the preferential benefits to that industry. Again the benefits to the nation have grossly outweighed the cost in the simple facts that the United States petroleum industry dominates this branch of industry in the world, has had the ability to provide the United States and its allies with abundant energy in times of peace and war, has had the strength to conduct the research which has spun off the great new petro-chemical industries whose products now pervade our society, and the ability to continuously explore for, discover, and bring into economic production enormous reserves of resources in all parts of the world, both on the land and under the sea. All this has been done while keeping the cost of energy and the other products from these resources at such a low level that the social and economic benefits to society far outweigh the costs.

The third large source of organic material, the living resources of the sea, has been very nearly ignored by the United States for the past two generations. Expenditures and activities to promote production from these enormous resources have been kept at low level; incentives have not been provided for domestic fishermen to go upon the sea; basic and applied research on ocean resources has been poorly funded; management of their use has been generally left to the 50 State Governments; incentives and aids have been provided to foreign ocean producers to compete with national industry; tariff and other barriers to imports have been lowered to encourage the products of foreign fishermen to enter the domestic market; stringent application has been made of the anti-trust regulations which prevent cooperation among business entities normal to the agricultural and petroleum fields; world wide operations of United States firms have not been integrated to foreign policy as with either agricultural or petroleum firms; incentives have not been provided for fishing firms to explore, develop and produce.

The detail and results of this inattention are treated below but can be summed up by saying that the catch of U.S. flag vessels was a little less in 1967 than it was in 1934; 71.4% by original weight of the fish and shellfish used by the United States in 1967 was imported at a cost of \$687 million (a fair percentage of the foreign exchange imbalance); and that known living resources in coastal waters are so underutilized that production from them could be increased by a factor of 10. The attraction of these large underused resources is so great that fishermen of 14 nations in Europe and Asia come to these coasts for these harvests and take from them each year somewhat more than half as much as do U.S. flag fishermen, which results in considerable political and diplomatic interaction.

There is a trenchant difference between obtaining access to, and managing the use of, living resources of the land and fossil fuels on the one hand, and the living resources of the ocean on the other. Substantially all land resources, including those of the continental shelf, are the property of some person, entity, or group of people organized into a government. In contrast the living resources of the high seas (which cover more than $\frac{2}{3}$ of the earth surface by any definition now used) are the common property of all sovereigns, and first become private property only when reduced to possession.

This characteristic of marine living resources, plus their highly migratory nature, gives rise to economics of activity respecting them, national and private policies toward their management and use, international implications growing out of their management and use, and aspects of access to them quite different than those applying to land resources.

Aside from maintaining continuing access to this major primary source of organic material for the nourishment of its industry and people, the international character of these high seas resources require that the general policy and strategy of the United States respecting the use of the ocean must take their use by it into account.

Such a general policy will require to include the following as major goals at the present stage of history:

1. To use the ocean to stabilize world order by providing for food and other natural resources, by keeping the oceans open to navigation by all, by preserving the seas as a source of recreation, and by using the ocean to mount ventures with truly international objectives, particularly in advancing the frontiers of planetary knowledge;
2. To promote the economic and social interests of the United States by providing the means and safeguards to profitable investments and a more effective use of the ocean;
3. To use the ocean in manners designed to maintain the validity and credibility of a nuclear deterrent so long as that is needed for promoting peace; and
4. To provide the capability of effectively deterring any attempt by other nation states, jointly or severally, to enlarge their sphere of influence by subversion, or wars of liberation, in manners substantially threatening world order.

Within such general ocean policy goals a fishing industry can contribute to the support of the domestic economy and its food desires, to enlarging foreign trade, to balancing the foreign exchange flow, to providing programs of technical assistance, and, at least in times of stress, to conduct auxiliary functions useful to the military.

A. U.S. fishery activity

1. In terms of volume of production the catch of fish and shellfish by U.S. flag vessels was about 2 million short tons in 1967. This was a little less than production in 1934 and 1947, and there has been no persistent trend up or down in total catches during this thirty-five year period.

In terms of round weight the proportion of supply of fishery products to the United States provided by U.S. flag vessels has dropped steadily. In 1948 it was 80%, in 1957—67%, and in 1967—28.6%.

2. The export of domestic fishery products was valued at \$82 million in 1967. This was a little more than double the annual level during the previous decade. This was about three-tenths of 1% of total exports by the United States in 1967.

3. In terms of value the cost of imported fishery products was \$687 million in 1967. This was second only to 1966, and 1968 record will be higher than either. This value has increased steadily in the post-war period and sharply in recent years (1965—\$601 million). They were valued at \$198 million in 1950 and \$299 million in 1957. The value of fishery product imports has grown to a ponderable proportion of the United States negative balance of international payments, and provides about 3% of the value of all imports.

4. The United States gave bilateral technical assistance in fishery development in terms of tens of millions of dollars in the period directly after World War II, but in the last decade this has tapered off to nearly nothing. U.S. flag fishing vessels have not been used in such work for a number of years, nor have fishermen. Such bilateral technical assistance in marine fishery development as now exists in United States policy is pretty well restricted to modest scientific, administrative and advisory services, and training and travel grants. The U.S. fishing industry is little involved with this remnant.

The United States provides budgetary, moral and advisory support of a modest nature to multilateral fishery technical assistance projects of consequential im-

portance on a world basis through the United Nations Development Program and FAO Department of Fisheries. There is beginning to be substantial support for fishery development projects in the developing world by the World Bank, and associated international credit organizations, and in this the United States provides its proportion of investment funds. These projects now involve expenditures by all concerned of about \$25 million per year. It supports in a similar manner, and on a lesser scale, related scientific work through the Intergovernmental Oceanographic Commission of UNESCO and the World Meteorological Organization. It is a member of nine intergovernmental fishery conservation commissions, whose scientific and managerial work it supports with an annual budget of somewhat more than \$2 million. The U.S. flag fishing industry is little involved in any of this except as an object of the work of the fishery commissions. FAO Department of Fisheries draws little upon fishing masters or nonscientific personnel trained in the U.S. fishing industry for its staff in these matters.

The processing and marketing segments of the United States fish business is involved to a greater or less extent in the active development of the fisheries of upwards of 30 countries and is one of the more important factors in fishery development in the developing world. It uses personnel trained in the United States flag fisheries rather extensively in these wide spread activities. This is not related in any direct way to United States policy or official technical assistance programs, and is little known of by officials responsible for the latter. It is not supported in any consequential manner by the United States Government. The sum of it is unrecorded.

5. At times in past history U.S. flag fishing vessels have provided support of greater or less importance to naval activities, particularly in times of stress, from the standpoint of vessel and crew strength and intelligence. The last such occasion was the Pacific War when a considerable segment of the tuna fleet was taken into Navy service, and other fleets of smaller individual vessel size performed coastal patrol duty for periods of time. The growing technological specialization of the U.S. Navy since that time, and the relative stagnation in growth of the U.S. flag fishing fleet in the intervening time, have divorced the two interests so that at the present time little consequential relationship exists between the two.

Thus from the standpoint of five major fields in which a national flag fishing industry can contribute to the posture of a major sea power, that of the United States is of little consequence to it. The U.S. flag fishing fleet has been stable as to overall physical productivity for thirty years, it provides a decreasing share of fishery products used by the United States economy (which is now below 30% of such use), and its contribution in value to the Gross National Product is inconsequential; the value of export products for which it provides the base is growing, but they amount to less than half of 1% of the value of total exports; the contribution to the foreign exchange balance is substantial and negative, the costs of fishery imports exceeding those of exports by about \$605 million in 1967, with the gap growing between value of fishery imports and exports rather steadily; the contribution of the U.S. flag fishing fleet either to governmentally sponsored technical assistance or military and diplomatic posture is negligible.

B. Contrast with situation of the Soviet-flag fishing fleet

It is valid to contrast the contribution of Soviet fishing strength to Soviet posture with that of the United States, as noted above, because these two nation states are the principal present elements in the world power structure and are competing on many fronts.

1. In terms of volume of production the catch of fish and shellfish by Soviet flag vessels was 5.8 million short tons in 1966. The current five year plan anticipates production to be about 10 million short tons in 1975. It had been 1.7 tons in 1938, and 2.8 million tons in 1957. The accurate value of the 1966 catches are not at hand, but can be reckoned at not less than \$1 billion at dockside.

2. As of 1967 fish and fish products made up 34.2% of the animal protein supply of the U.S.S.R. The per capita consumption of fish products in U.S.S.R. was 5.2 kilograms in 1913, was 13.5 kilograms in 1966, and is planned to be 20 kilograms in 1970. Three billion rubles (\$3.2 billion) have been allocated to improving the capital structure of the fish business during the current five year plan. While full statistics of imports and exports are not at hand it is known that imports of fish products have declined relative to production and absolutely, and that the export of fish products has expanded steadily.

3. Fishery development forms a prominent part of Soviet technical assistance. Group fellowship tours, seminars and studies in fishery development and tech-

nology in cooperation with FAO, and involving fishery students from Asia, Africa and Latin America, have become a recurrent and important source of such assistance to countries in those regions. Bilateral fishery development schemes of important size and continuing benefit have been, or are being, implemented with Cuba, Senegal, Ghana, United Arab Republic, Yemen, Sudan, Somalia, Tanzania and Indonesia. Assistance of lesser, but consequential extent, has been rendered to South Yemen, India, Pakistan and Burma. The incidental sale of fish from Russian vessels has yielded substantial amounts of currencies, as well as rendering nutritional benefit, to such countries as Congo, Nigeria, Ghana, Dahomey, Togo, Sierra Leone, Liberia, Guinea, Algeria, Libya, Egypt, Sudan, Yemen, South Yemen, and Tanzania.

4. Russian-flag fishing vessels work in all seas: Arctic, Antarctic, Pacific, Atlantic and Indian Ocean. They fish regularly off Alaska, Washington, Oregon, California, in the Gulf of Mexico, off Florida, the middle Atlantic States, and New England. The foreign bases established for their use in Cuba, Senegal, Egypt, Yemen, Somalia, Tanzania, and Indonesia are conveniently located relative to important channels of merchant marine travel, and possible future naval action. Well instrumented Soviet fishing vessels are ubiquitous where there are United States or NATO naval maneuvers, space or special weapons shots in prospect, or regular military activities by the United States being conducted (such as Guam, Rota Bay, California, etc.). The military consequence of Russian fishing activity on a world wide basis is not known, but it is certainly in a different order of magnitude than the contribution of the United States flag fishing fleet to United States military posture.

C..The general fish business

There are some general movements in the fish business that are useful to look at in a consideration of the situation of U.S. flag fishing. Among these are:

1. *World Production.*—World production of fish and shellfish was 23 million short tons in 1938; 23.2 million tons in 1950; 34.6 million in 1957; 44 million tons in 1960; and 62.5 million tons in 1966. While the complete figures for 1967 are not yet available they were higher than those for 1966. It is likely that world production will be close to 65 million short tons in 1968. Total value in 1966 at fishermen level was about \$9 billion, well more than twice the value of all minerals (including petroleum) taken from the Six nations out of the approximately 138 in the world presently caught about 57% of *seabed* the world total in 1966. These were, in production rank, Peru, Japan, Mainland China, U.S.S.R., Norway, and the U.S. The statistics for Mainland China are open to serious doubt since about 1957. The situation of each of these national fisheries is quite different.

(a) *Peru.*—The Peruvian fishery is supported almost entirely by one species, anchovetta, which is made into one product, fish meal (and oil). Total landings were 26,400 short tons in 1938, still only a half million tons in 1957, and then were 9.7 million short tons in 1966 (having been a little higher in both 1964 and 1967). All of the fish are caught off the coast of Peru and within a few mile of shore. Although the per capita consumption of fish in Peru trends upward, substantially all of the product of the fishery is exported, on a world wide basis. The fishery is conducted on a profit basis by private industry. The chief national interest in the fishery is in support of the domestic economy and in the earning of foreign exchange. It provides the largest export item for Peru in terms of both volume and value.

(b) *Japan.*—The Japanese fishery, unlike that of Peru, has been a major national industry for many years. Both pre-war and post-war, Japan was the top fish producer in the world. It remained so until Peru surged ahead of it in 1963. The value of the Japanese catch is much higher than that of Peru. The average value of the Japanese catch is just under \$250.00 per ton, whereas that of Peru is just under \$10.00 per ton.

The Japanese fishery is in the hands of private industry and operates fully on a profit basis, but with much policy guidance and support from Government. In the post-war period the national policy under which it was directed included maximization of physical yield from the fishery, maximization of the accumulation of capital through the fishery, and maximization of use of labor in the fishery. In recent years the tightening labor situation domestically has relaxed the third objective. Fishery products are the prime animal protein content of the Japanese diet and prime earner of foreign exchange.

The resources around the home islands are heavily and fully used but since about 1952 the Japanese fisheries have spread out actively to world wide extent, and are still increasing both in productivity and geographic range. In the last two

or three years Japan, despite increasing catches, has become a substantial net importer of fish, buying what its market demands and selling that for which it can get a better price abroad. In the first few years after the war Japanese fishermen had difficulty in obtaining fishing bases around the world. In the past decade this has substantially changed and much Japanese fishing now works out of foreign bases as well as operating in a long-range manner from the home islands and in local fisheries out of the home islands.

From almost any viewpoint the Japanese flag fishing industry, except for total volume of catch, is the most broadly based, generally expert, experienced, and productive in the world. While operating at high levels of private initiative it is integrated at all levels from individual fishermen through vessel owners, processors, marketers, trading firms, Fishery Agency and Foreign Ministry and Ministry of International Trade and Industry in a most effective and generally efficient way that renders the industry as a whole most responsive to the vagaries of the fish business and innovative to the point of daring in its response to stress.

(c) *China (Mainland).*—The production of fish and shellfish in Mainland China is unknown within broad range of error. In 1938 it was purportedly a half million tons and in 1957 it was rated at 3.3 million short tons. The last reported figure was 6.4 million short tons in 1960, but how much this is composed of fish and how much of propaganda is uncertain. The bulk of production is purported to be from fresh waters and Chinese fishermen do not operate far off shore the China mainland. There appears to have been little modernization of ocean fishing and there is no long range fleet.

(d) *Russia.*—Prior to the middle 1950's the production of fish by Russia was chiefly from internal and coastal waters. It was 1.7 million short tons in 1938, 1.7 million tons in 1950, and 2.2 million tons in 1953. Beginning about 1954 Russia began a solid push toward developing its existing fisheries and extending them out into distant waters. Under the pressure of succeeding five year plans it has developed its high seas fisheries in a spectacular manner. Without the easy availability of enormous coastal resources (as with Peru), or long high seas tradition (as with Japan and Norway), or technologically sophisticated industrial background (as with the United States), or the climatic and socio-economic predilection to pond-raising of fish (as with China), it has forged steadily ahead by brute strength, national purpose, and the application of major amount of capital and labor to become a major fishing nation of the high seas. Some further details are treated below.

This is a fully State owned enterprise carried out by massive application of capital, specialized labor and elaborate planning. It is a fully integrated industry beyond the scale even of Japan. It is fully an instrument of national policy. Strategically it forms, with naval and merchant marine expansion, a major part in the thrust to break out of the encirclement strategy of the free-world coalition by obtaining full access to the world through use of the free highways of the ocean. Diplomatically it has been an instrument of consequence in the technical assistance field. Economically it has filled the internal desire and need for animal protein in the Russian diet which could not be filled so quickly or cheaply through land based internal animal husbandry. Increasingly it has reduced the necessity to spend foreign currency to buy fish (formerly done on a substantial scale from Scandinavia and England in particular), and has begun to become a net earner of foreign exchange. Each million ton increase in landings equates to a saving in foreign exchange of somewhat more than \$200 million. Catches have inclined steadily upward to reach a total of 5.8 million short tons in 1966. They are scheduled to reach 10 million short tons by 1975, at which time it is anticipated that they will be yielding \$100 million per year in foreign exchange aside from their contribution to the domestic nutrition and economy.

This tremendous tour de force has not arisen out of Russian technology. There has been liberal application of foreign exchange to buy the best technology from wherever it could be had. Danish, English, and West German shipyards produced most of the first classes of high seas vessels, and this purchasing practice has since spread to France, Poland, Japan and East Germany in a substantial manner. Processing machinery and modern instrumentation and gear was similarly purchased abroad and adapted to Russian conditions. It is estimated that \$4 billion was invested in expanding the fish business between 1946 and 1965. The current five year plan has allocated \$3.2 billion for this purpose.

Although high initial dependence was placed upon adaptation of foreign technology to Russian fishery needs in these formative years, great emphasis is now being given quite successfully to strengthening Russian technology in this field.

A massive educational and training program has developed particularly for the needs of the fishing industry at all levels from oceanographic science of considerable sophistication to the training of fishing crews for action in all oceans and under all climatic conditions.

The Russian fishery expansion has been noted for its successful innovations in the application of science and technology, together with carefully integrated planning, to the problems of fishery development and production. In this it is without a current peer in the world. With substantially no natural advantages or tradition of high seas enterprise Russia has become in fifteen years time the fourth (and probably actually the third) largest fish producer in the world, and is headed toward being the first in less than five years. It operates anywhere in the world where marine living resources are found in economically harvestable quantities. It searches out the location of such resources with more energy and competence than any other nation currently exerts.

(e) *Norway*.—Norway has always lived by the sea and depended heavily on cod and herring for the bulk of its fish production. Aside from whaling in Antarctica and elsewhere, its fishing has been, and is, largely restricted to the North Atlantic and the adjacent Arctic. Its current surge forward in production is attributable mainly to a successful adaptation of scientific scouting and search procedures, sonar location procedures, and power block plus synthetic webbing in purse seine procedures, to increasing production of herring, mackerel and capelin from the Northeast Atlantic, and chiefly for the production of fish meal. Production was 1.1 million short tons in 1938, 1.9 million tons in 1957 and 3.1 million short tons in 1966.

Norwegian fishery development is not spectacular or explosive as with Peru, Japan and Russia, but it is solid.

Although conducted on a profit basis as free enterprise there is a much higher level of governmental guidance and support than in Peru, the United States, or probably even Japan. Although an important part of the internal economy, and basic to the nutritional requirements of the nation, the chief emphasis is on producing fish products for export and the earning of foreign exchange. The fishing industry has filled an important role in Norwegian technical assistance. This has been particularly successful in India, and is becoming so in Ghana, but has also been helpful in Burma, and to a limited extent elsewhere.

(f) *United States*.—Unlike the situation in Peru, Japan, Russia, and Norway the United States flag fishing industry has had little to contribute to United States strategy, general posture, policy or social purpose in the years since the end of World War II, although United States Government and academic scientist's have contributed in a major way to world-wide fishery and ocean science, and the United States fish business aside from U.S. flag fishing has had a powerful effect on world wide fishery development in other nations. In some respect in fact, U.S. flag fishing has been a nuisance to United States policy and foreign relations.

From the end of World War II until about 1965 the United States not only did not need any extra food but had embarrassing surplus, of which it had great difficulty in disposing. This was the case with animal protein (dairy products and eggs particularly) as with cereals and edible oils. The production of the fisheries, if increased, would only have added to this surplus of animal protein and edible oil.

For at least the period 1945 to 1955 (and actually continuing longer in a more passive way) the United States had a strong policy objective of building up the economies of allied countries and creating conditions so they could earn dollars. A strong need was felt to redress foreign exchange balance in favor of foreign countries. Political power in this field in the United States lay with exporters and not with domestic fish producers. After the first surge of enthusiasm for rebuilding and the economies of war torn countries and world trade, substantial enthusiasm and political force arose to aid in building the economy of the developing world. All this applied particularly, at first, to Canada, Mexico, Japan, and the countries of Western Europe. It more recently has been applied to countries of the developing world. These objectives could be rather quickly served in fisheries by assisting initially with development funds and materials, and providing market for the product. This policy has worked quite successfully, but to the disadvantage of U.S. domestic flag fishing whose production was in the direction of impeding the rapid application of this policy, and whose political power internally was small, and continuously shrinking during the period.

The development of the strategies and technologies associated with the nuclear deterrent policy brought a quite rapid divorcement between the United States

Navy and U.S. flag fishing fleet after 1945. There was simply not much of importance that the U.S. flag fishing industry could do for the Navy that the Navy could not do for itself better, cheaper, and more quickly.

For the first five years after the war elements of the fishing industry were of considerable value in assisting the application of technical assistance in Western Europe, Latin America and Asia. After this short period this sort of bilateral technical assistance by the U.S. tapered off rather sharply and for the past decade has been at a low level and desultory, to the point where it has scarcely existed for the last five years.

The domestic U.S. flag fishing industry thus has had no vital national role to play in the post war period as it has had in the other leading fish producing countries of the world. It has been almost exclusively without government guidance outside the Bureau of Commercial Fisheries, and with as little governmental support as the Executive Branch of the Government could contrive and keep domestic controversy within reasonable limits. The Bureau of Commercial Fisheries has not had high level support either in the Department of the Interior or in the Bureau of the Budget because domestic fish production was not critical to the objectives of the Executive Branch of the Government. Agriculture had the votes and the political power in the food field, not the domestic fishermen. The United States fish business has thus become exclusively profit motivated in an exceedingly competitive milieu, in which the policies of its government increased the competitive stress rather than relieved it.

As a matter of fact the U.S. flag fishing business has been more a nuisance than a benefit to the policies of the Executive Branch of the National Government over the past twenty years. Fighting for places in the internal market the ground fish industry, the tuna industry, and the shrimp industry have taken vigorous actions seeking tariff or quota protection that have been difficult for the Executive to fight off, and which have repeatedly caused embarrassment to it with such allies and friends as Japan, Peru, Mexico, Canada, Norway, etc. Fighting for protection to fish in the high seas off Latin America the shrimp and tuna industries have kept the Department of State in hot water continuously in Latin America, and in respect of the whole Law of the Sea on the broad international front. Fighting for protection against fishing ground competition from Asian and European fishermen in coastal waters of the United States, from Maine to Nome, Alaska, has caused continuous embarrassment to the Executive Branch of the United States Government in the Congress and with the Foreign Offices of affected nations. In these struggles to survive a dichotomy of purpose and thrust has developed between the domestic distant water fishermen and the coastal fishermen of the United States that has frequently disturbed the government and decreased the political influence of both sorts of fishermen with it, to their mutual disadvantage.

Curious side effects have arisen. By 1955 a marked schism had developed between the U.S.-flag fishing industry and the domestic processors that purchased their product and marketed it. This has continued to grow. This was particularly the case in the ground fish and tuna industries, where the processors and distributors became increasingly dependent upon foreign supplies and increasingly disinterested in the socio-economic problems of the domestic fishermen. In the competitive struggle to keep alive, the processors and distributors centered their activities increasingly on their particular problems to the extent that the large industries related to fish meal, shrimp, salmon, tuna, and ground fish became increasingly compartmented away from each other. Decreasing profit and fragmentation of effort diminished the taking of innovative risk and destroyed such national representation as the industry had emerged from the war with. Interaction among the fragments became more evident than cooperation. The result was that both the Congress and the Executive Branch were increasingly impertuned by highly specialized interests within the overall industry to attend to their specific problems as specialized interests, rather than as national problems of importance to large segments or the whole, of United States society. The fishing industry as a whole, instead of being an instrument of the society in this field, became an annoying, squabbling group of special interests, none of which was able to secure the attention of the society or government to the real problems that required solution if it was to become a socially useful instrument in this field.

In the past decade the processors and distributors of fishery products have continued to prosper and grow as the internal market for fishery products developed. They increasingly have searched for product and raw material to fill their needs on a world wide basis. In the past decade this series of branches of

the United States fish business had become increasingly effective in stimulating fishery development on a world-wide basis, particularly in respect of shrimp, tuna, fish meal and ground fish. They have paid continuously a less amount of attention to the product of domestic fishermen as the proportion of fishery products consumed in the United States has dropped from the 80% dependence on domestic supplies that existed in 1948 to the 28.6% dependence that existed in 1967 (it will be less in 1968 than it was in 1967).

Accordingly the U.S. flag fishermen have become increasingly less important to their direct customers as they have become to the several aspects of United States policy and strategy noted above. In these frustrating circumstances the fishermen from the particular coastal area have importuned their particular Senators and Congressmen for increased federal attention to their specific problems and this has resulted in further fragmentation of remedial measures, couched in terms of regional and specific palliatives rather than as solutions to problems having national importance and scope.

In consequence of the absence of any national policy, or recognition of any national need, some fisheries have thrived (tuna, shrimp, king crab) on perseverance and economic opportunity, others have vanished or diminished through lack of conservation measures (California sardine, Pacific mackerel, oysters, and now menhaden), or stagnated from lack of opportunity (ground fish), and some have just wasted away or held level by effects outside their control (oysters, clams, and the other products of polluted estuaries). In overall perspective United States flag production has held about level for 30 years, having been 2.3 million tons in 1938, 2.8 million tons in 1957, and 2.1 million tons in 1967. It will be a little less in 1968 than in 1967.

CHAPTER II—U.S. USE OF FISHERY PRODUCTS THE NATURE OF UNITED STATES FISH BUSINESS

The use of fishery products in the United States for all purposes has increased steadily over the years in both absolute and per capita terms. In 1948 this use (in terms of round weight) was 2.9 million short tons, in 1957 it was 3.7 million tons, and in 1967 it was 7.1 million tons (14,187 million pounds). It will be higher in 1968 than in preceding years.

The per capita annual use in 1967 was about 70 pounds. This is one of the higher statistics of per capital consumption of fishery products in the world. The effect has been to make the United States the largest importer of fish in the world, one of the most lucrative fish markets in the world, and user of about 13% of the total production of fish and shellfish in the world, in spite of having only about 6% of the world's population. The rapid increase in use of fishery products in the United States has been in terms of both volume and value. In 1948 the value of U.S. catch at the fishermen's level plus the value of fishery products imported was \$428 million in 1957 it was \$652 million, and ten years later (in 1967) it had nearly doubled to \$1,125 million. It will be higher in 1968 than in previous years.

(a) Fish meal and related products—U.S. use of fishery products

In terms of volume of product used, and increase in use, the overwhelming item has been the category called industrial fishery products by the Bureau of Commercial Fisheries. In terms of round weight this use amounted to 1.8 billion pounds in 1948, 3.1 billion pounds in 1957, and 9.1 billion pounds in 1967 (or 65% of the total supply of fishery products to the United States). In 1968 the volume, and percent of total use, will be higher than in previous years.

This category is primarily composed of fish meal and it is this commodity which has experienced the spectacular rise in use. It is used in animal husbandry and primarily in chicken nutrition. The use of fish for pet food has been steadily increasing too.

The increase in supply of this commodity has come chiefly from imports. In 1948 imports supplied 23.1% of the total; in 1957—26.1%; and in 1967—81.6% of the total. In 1968 the supply, and the percentage of it supplied by imports, will be higher than in preceding years, with 1968 the highest on record. Use of fish meal alone will be nearly 850,000 tons in 1968 which would be the round weight equivalent of about 4.7 million tons of fish, or more than double the total catch of fish and shellfish by United States vessels in terms of physical volume. Most of the imports of fish meal come from Peru.

The imports non-edible fish products to the United States in 1967 were valued at \$155 million, or 23% of the total value of fishery imports.

(b) Shrimp

The single crop of greatest value to United States flag fishing vessels is shrimp. In 1967 this yielded United States fishermen a little more than \$100 million at dockside (nearly a fifth of their total income).

In 1948 the total supply of shrimp to the United States in terms of heads-off weight, was 121 million pounds; in 1957—191 million pounds—and in 1967—395 million pounds, which is the equivalent of about 600 million pounds round weight. The United States market for shrimp continues to increase at a fairly steady rate, which is greater than the rate of population increase, and there is every reason to believe that this will continue for the foreseeable future.

It needs to be kept in mind that there are two main kinds of shrimp presently sold in the United States, the *Penaeid* and the *Pandalid* shrimp.

Most of the market has been built on *Penaeid* shrimp, which come from the lower latitudes (tropics and sub-tropics around the world). These form the predominant part of United States caught shrimp (chiefly from the Gulf of Mexico, Southeast Atlantic States and Caribbean area). There are not enough resources of this sort of shrimp in United States coastal waters to much more than half fill the present United States market. Accordingly United States processors have stimulated fisheries for this kind of shrimp all around the world to provide raw material for their markets here, and they are still doing so. Resources of this sort in coastal United States waters are producing about at maximum sustainable yield level (which varies a good deal from year to year, depending upon environmental changes).

On the other hand the underutilized resources of *Pandalid* shrimp in coastal United States waters are very large. The best present estimate is that this resource off Alaska alone will eventually produce about as much *Pandalid* shrimp as the Gulf of Mexico produces *Penaeid* shrimp when the fishery there is fully developed. This sort of shrimp also occurs in commercial volume as far south as Northern California on the Pacific Coast and the Gulf of Maine on the Atlantic coast.

Mature *Pandalid* shrimp on average are much smaller than *Penaeid* shrimp and they do not occupy quite the same market in the United States. In fact it is questionable that the growing market for *Pandalid* shrimp is even very strongly competitive with that for *Penaeid* shrimp. The chief thing that has held back the production and sale of the small *Pandalid* shrimp has been the technology of peeling them economically and preparing them for market. This problem is now in the process of solution and their catch is going up sharply on the Pacific coast (chiefly Alaska). Production was 15 million pounds as recently as 1964, and 59 million pounds in 1967. It is estimated that this will continue to grow quite rapidly as least to the 300 million pound per year level.

The total United States flag catch of all kinds of shrimp, while varying from year to year, has increased slowly over the years. The increase in supply for the past twenty years has come chiefly, however, from imports. These yielded 18% of the total supply in 1951, 36% in 1957, and 51% in 1967 (having been 57% in 1966, but reduced in 1967 by the extraordinarily large crop of *Penaeid* shrimp that year in the Gulf of Mexico plus the sharply growing *Pandalid* production in Alaska).

The United States now imports shrimp from upwards of fifty countries, of which Mexico is the most important supplier. In many of these countries the product is from fisheries established by United States firms, sometimes as wholly owned subsidiaries using in some cases U.S. flag vessels with U.S. skippers, sometimes as joint ventures with local entrepreneurs, sometimes foreign owned ventures supported by U.S. private industry loan capital, and sometimes wholly foreign ventures stimulated only by guaranteed markets in the United States. The value of shrimp imports to the United States in 1967 was more than \$150 million, or somewhat more than a fifth the total value of all fishery imports.

(c) Tuna

Substantially all tuna used in the United States is used in the canned form. It provides much the largest volume and value of canned sea food used in the United States. United States canned tuna production in 1967 was about 20 million standard cases, or about half the total canned fishery products produced in the United States. The canned weight of the total supply of tuna to the United States was 454 million pounds, of which 14.4% was canned imports and the rest canned in the United States. The wholesale value of the canned tuna supply in 1967 was above \$350 million or about 12% of the total value of fishery products at the wholesale level in that year.

The consumption of canned tuna (as with shrimp) continues to grow at a more rapid rate than the population. In terms of canned weight the supply of tuna to the United States was 140 million pounds in 1948, 277 million pounds in 1957, and 454 million pounds in 1967. The percentage of this supplied by imports was 7.5% in 1948—49.4% in 1957—and 45.2% in 1967 (having been 52.8% in 1966, but reduced in 1967 by extraordinarily heavy landings by U.S. flag vessels). The actual catch by U.S. flag vessels has held reasonably level for the past twenty years, having been 329 million pounds in 1948, 304 million pounds in 1957—332 million pounds in 1966—but going up sharply to 427 million pounds in 1967. In the past two years approximately \$30 million worth of new long-range tuna clippers has been added to the fleet, mostly from private financing, and the yield from this larger U.S. flag tuna fleet is beginning to be felt.

As with shrimp, there are not enough tuna off the coast of the United States to fill the market. As a matter of fact most of the production by U.S. flag vessels (as noted in more detail below) is caught south of the United States off western Latin America and West Africa (chiefly the former). There are supplies available off Northeast United States, in the Atlantic, but so far they have not proven large enough, or stable enough in occurrence, to support much of a regular commercial fisheries.

In consequence the U.S. tuna producers have steadily increased their imports of frozen tuna for canning for twenty years, buying tuna from foreign catches in the tropical world ocean everywhere, not only the Pacific, but the Atlantic and Indian Ocean, and establishing production bases outside the continental United States to advance this purpose. They use well more than one-third of all the tuna caught in the world. The value of tuna imports in 1967 was approximately \$100 million, with a little more than one-half (about \$55 million) being in the frozen form for canning in the United States. The value of all tuna imports was a little less than one-fifth the total value of all fishery imports in 1967.

(d) Frozen groundfish, fillets and steaks

The supply of frozen ground fish, fillets, and steaks to the United States was 256 million pounds in 1948, 358 million pounds in 1957, and 541 million pounds in 1967. This equates roughly, in round weight, to 845 million pounds in 1948, 1,181 million pounds in 1957; and 1,900 million pounds in 1967. As with shrimp and tuna, the United States market for these commodities increase at a more rapid rate than the population increase, and there is no reason to believe this will not continue to be the case for a long time.

These commodities provide the raw material for fish portions, fish sandwiches, fish sticks, fish chips, and a number of other new products which continue to proliferate and attract new demand throughout the United States in sharp contrast to the condition of a generation ago when these sorts of fish were rarely attainable very far inland from the sea-coast or Great Lakes. The popularity of fish in these new frozen forms continues to increase at a more rapid rate than population as quality at the customer level, means of distribution, and familiarity with the products, in the interior in particular, continues to increase. This can be expected to continue into the foreseeable future.

The supply of these fishery commodities to the United States in 1967 was about 523 million pounds in terms of round weight. The imports were 369 million pounds, or about 70% of the total. The value of the imports are hard to calculate from existing published figures because the products come in in different forms, but largely in semi-processed forms as frozen slabs or block of dressed fish. Perhaps a valuation of \$90 million for the actual imports in 1967 would be in reach of the proper value at this level.

The situation of the groundfish industry from which these products is received is complex, and will be treated in greater detail below. At this point it is sufficient to say that there are large supplies of fish suitable for these products in United States coastal waters. Some of these (particularly in the Northwest Atlantic) are fully utilized, or in some cases, overfished by both United States and foreign fishermen. Some of these (particularly in Alaska and down along the Pacific coast) are fairly fully utilized by domestic and foreign fishermen. Some of these (particularly along the Pacific coast and off Alaska, and to some extent in the Gulf of Mexico), are substantially underutilized.

The trawler fleet of United States flag vessels which produces this sort of fish has been the part of the U.S. flag fishing fleet most seriously influenced by inattention, invasion of market by foreign fish with U.S. Government assistance, and by the subsidization of foreign competitive fleets.

(e) General comments

The purpose of singling out these four classes of fishery products for particular identification is to note their combined importance in the total United States fishery product market. Together they used just short of 90% of the total fish supply used in the United States in 1967, in terms of round weight, and in terms of value at the wholesale level the products made from them (from imported as well as U.S. flag fishing vessels) was about half of the total for the United States (\$1.2 billion). These are the four classes of fishery products for which the market in the United States has been increasing for the past twenty years at a rate greater than that of the population.

Obviously, these are the four prime categories of fishing products in the United States when considered from the viewpoints of growth and demand, volume of use, value of product, and total effect on United States flag fishing.

In the case of two of these commodity classes (tuna and shrimp) physical volume production by U.S. flag vessels has held reasonably constant over recent years and in both instances now seems to be inclining upward slightly. The share of these two markets provided by imports has crept up to slightly over 50% of the total. United States processors and distributors of these two product classes have grown rapidly in volume of their business, have generally prospered, and have expanded broadly in foreign as well as domestic ventures. Still the two domestic fisheries providing raw material are in reasonably sound economic conditions, if not prosperous. Both are now in a period of growth. The tuna fleet is expanding into larger, longer-ranging vessels that are beginning to penetrate the West African, as well as the more familiar Western Latin American, grounds in a substantial manner. The shrimp fleet in the Gulf of Mexico, after a number of years of experimenting with the technology, is beginning to move successfully into larger, longer-range, vessels equipped to freeze product aboard, which is resulting in geographic expansion of the U.S. flag fishery in the Caribbean area. The Alaska shrimp fleet, an entirely different business, working on different resource base and producing for a substantially separate market, is just beginning substantial growth which should persist for several years.

It may also be noted that the tuna and shrimp fisheries have been less plagued by State regulations than is normal in the United States fisheries.

In the other two classes of commodities (fish meal and frozen fish blocks primarily) production by United States flag vessels has trended down absolutely as well as relatively. The share of the market provided by imports has crept above 70%, and the two domestic fisheries supporting them are not in reasonably sound economic condition. In both cases market is sound and steadily growing, and resources to support U.S. fisheries are ample in U.S. coastal waters. Accordingly a more detailed examination of these two fisheries is made below.

B. Changing consumption pattern for fishery products in the United States

The Department of Agriculture (followed by the Bureau of Commercial Fisheries) has a statistic of fishery consumption which it has used for a long while in keeping track of the per capita consumption of various food products in the United States. Defined by its terms the per capita consumption of fish in the United States has varied between 7.9 to 12.2 pounds of edible meat per year since 1916. The high point of 12.2 pounds was in 1927 and the low point of 7.9 was in 1943.

The series shows no long term trend of consequence in this 51 year period. If there is any trend, it is a slight drop-off over the past 10 years. The per capita consumption of edible fish meat was 11.0 pounds in 1916 and 10.6 pounds in 1967. This series of statistics probably deserves recalculation because of the changing product composition over the years, but it is the series that is available and ordinarily quoted. It is obvious that the series has inconsistencies in it if one divides the statistic of supply of edible fish to the United States per year (also published by the Bureau of Commercial Fisheries) by the population of the United States. Within the series there have been sharp long term trends in several major products.

The per capita consumption of canned salmon has declined rather steadily from 3.0 pounds in 1936 to 0.8 pound in 1967. In canned sardine the statistic has gone down rather steadily from 1.3 pounds in 1936 to 0.3 pound in 1967. Cured fish of all sorts went from a high point of 2.8 pounds per capita in 1916 rather steadily down to 0.5 pound per capita in 1967.

On the other hand three other products have gone up steadily in per capita use during the period. Canned tuna was at 0.4 pound per capita in 1936 and rose to 2.4 pounds per capita in 1967; shrimp was at 0.35 pound per capita in 1936

and 1.28 in 1967; groundfish and ocean perch fillets and blocks were at 0.74 pound per capita in 1936 and rose to 1.79 pounds per capita in 1967.

The decrease in relative and total use of salmon can be attributed to failing supply. There just was not as much salmon available in 1967 as there was in 1936. On the other hand the trend away from cured fish and the trend toward canned tuna, shrimp of all sorts of preparations, and frozen fish sticks and portions represents definite changes in food habits. How much of this is attributable to convenience in form, convenience in price, changing packaging and merchandising patterns, is not known.

For the most part those fishery products that are increasing sharply in use are new product forms which have been developed by innovative entrepreneurs, catch on, and are merchandised hard.

Tuna started out as really a scrap fish for which there was no consumer's market in the United States in any form. It still has no consequential sale in the United States in any other form than canned, although in Japan it is consumed in large volume in many other forms (raw, dried, half-dried, as an ingredient in fish sausages, cakes, etc.). Canned tuna has been sold hard in the United States from the very start. There have always been heavy advertising, promotional and field selling costs relative to product price. Over the 60 years of the trade it has moved steadily from more or less regional sales by small canners to more and more consolidations into regional and then national sales by a few larger firms, to take advantage of national advertising, etc.

More than 50% of total tuna sales are now in the hands of three firms, and more than 75% in the hands of six firms. The marketing budget is high and merchandizing is still by the hard sell. The industry spends not less than \$30 million per year in marketing cost. Many attractive new tuna products have been developed over the years and also sold hard at much cost—such as tuna pies, tuna and noodles, tuna spreads, spiced tuna, dietetic tuna, tuna baby food, etc. One by one they have been tried, bloomed, wilted, and either died or dropped to a steady low level of acceptance—with chunk-style light meat canned tuna staying in the lead, and the more costly canned white meat tuna keeping a fairly steady pace in the market. It is obvious that when a housewife wants a can of tuna she wants it straight, and will then fix it up into some other dish to her taste and not that of a salesman. Tuna in brine has been merchandized very heavily for fifteen years and has a marked tariff differential over tuna in oil. Nevertheless, tuna in oil has continued to dominate the market and in recent years tuna in brine market has been shrinking. Despite extensive merchandizing it is obvious that most American housewives want tuna canned in oil.

Shrimp sales have gone through something of the same pattern as tuna but more so. Up until quite recently shrimp sales were heavily institutional (restaurants, etc.) and production and sales were in the hands of many firms. Such sales are not much affected by brand or advertising, and market promotion has been more on an industry wide basis for a long time than has been the case with tuna. In recent years there has been a good deal of consolidation into larger production units and a greater development of direct consumer sales. Just recently quite large firms have begun to enter the field, advertise national brands heavily, and thus move toward national distribution. This is being accompanied now by a flurry of introduction of new products using shrimp as a component.

The growth in consumption of ground fish in the United States has been truly astounding. In 1939 the whole product weight available to the United States market (ground fish, ocean perch, and other fillets and steaks) was 141 million pounds and by 1967 it was 522 million pounds. If this is multiplied by 3.3 to convert it back roughly into round weight equivalents, the increase in dock side weights needed to supply the market with these products would have been 465 million pounds in 1939 and 1,723 million pounds in 1967. This market is still growing steadily and 1966 was its year of record to that time (as it was with canned tuna and shrimp). There was a slight drop off in 1967 due to temporary market perturbation.

Once again this growth has been marked by the development and hard selling of innovative products reasonable in price, constant in quality, convenient to the user, and widely distributed. The sharp freezing of fish started the ball rolling and permitted the flow of good quality merchandise into the interior after World War I. The sharp freezing of fillets came next, reducing shipping costs and improving convenience. Then came the standard frozen fish block, where the skinned and boned fillets were sharp frozen in blocks that could be shipped conveniently to anywhere, stored conveniently until needed, and then sawed (still

frozen) into consumer size pieces, packaged and sold. This development made ground fish a fully world product with a world market (as with frozen tuna for canning and frozen shrimp).

In 1953 began the merchandizing of fish sticks, frozen raw or cooked, or breaded in either condition. These were fish-blocks cut into convenient sizes of about one ounce each with width about one third of length. This brought this sort of fish conveniently to the housewife, and it sold like hot cakes. Production was 7 million pounds in 1952 and 63 million pounds in 1955. The market then dropped slightly for two years, started back up and by 1960 was over 65 million pounds. In 1967 it was 74 million pounds. In 1958 fish portions started. This was simply a piece of fish block sawn to the thickness of a fish stick but not cut into strips. This fish portion was a convenient size for a home or restaurant meal, or a sandwich (and fish sandwiches are particularly good sellers in the mid-west). 22 million pounds were produced in 1958 and 60 million pounds in 1960. It has continued to increase sharply and was 158 million pounds in 1967. The individual frozen and packaged steaks or portions of larger fish such as salmon, halibut, turbot, snapper, etc., have added to this general product line.

In the last few years there have also been consolidations in this trade with larger firms entering it and merchandising on a regional, and more recently national, basis.

With all the changes in form and style that has taken place in the marketing of fish for human consumption, and no upward trend shown in per capita consumption of edible fish meat in the Department of Agriculture's statistic, the amount of fish used in the United States for direct human consumption has trended steadily upward, and is still doing so. In 1947 it was 3,662 million pounds round weight, and in 1966 (a record to that date) it was 5,422 million pounds, or about 4% of all of the fish and shellfish caught in the world. In 1967 it declined slightly to 5,068 million pounds, but will be up again in 1968. With all the talk about the United States not being a fish eating country, it is important to note that the per capita consumption of edible fish by direct human consumption is higher in the United States than the world average.

2. *Animal feeding.*—The domestic animals with which modern man has surrounded himself for his use or pleasure have roughly the same dietary needs as he has. Man feeds his animals with much greater attention to balanced nutrition than he does himself. Fish are used in many ways in this process. Fish meal is used on a large scale in chicken, pig and similar animal nutrition. It is used in calf starters and mink feed. Ground frozen fish is also an ingredient of mink feed, of fish being raised for market, in dog food, cat food, etc. The amount of fish thus used in the United States is enormous and is growing even more rapidly than that used for human consumption. In 1947 the amount used for this purpose was 1,414 million pounds round weight (less than half the amount used for direct human consumption). In 1967 it was 9.119 million pounds, or nearly 6% of all of the fish and shellfish produced in the world. Consumption for these purposes was higher in 1967 than in 1966, and will be higher yet in 1968. In this respect the United States has followed (or led) world trend. In 1948 1.5% of the world's fish catch was reduced to fish meal and oil, and in 1964 15.5%.

C. The changing organization of the fish trade in the United States

As recently as 1960 there was no firm in the United States engaged in the fish trade (except the California Packing Corporation) that did as much as \$100 million dollars with of all sorts of business per year, there were not a handful who did \$50 million dollars of business per year, and most firms in the fish trade of the United States did \$10 million per year of total business per year or less. At about that time there began a considerable amount of diversification of firms in the fish trade by buying up or amalgamating with other fish firms to have a broader and stronger base. This has been followed by these firms being bought up by much larger firms so that today principal positions in the fish trade are held by firms whose total business is from a half a billion dollars to a billion and a half dollars or more a year in all their activities. Examples includes the following—Castle and Cooke bought Bumble Bee Inc.,—Heinz bought Star-Kist Foods, Inc.—Consolidated Foods bought Booth Fisheries and some other things; Ralston-Purina bought Van Camp Sea Food Company and some other things; —W. R. Grace Company bought Trade Winds and Seapak; General Mills bought Gortons, which had recently been expanding and diversifying by acquisition; New England Fish Company—Whiz Fish Company and San Juan Fishing Company to its already large fleet and canning operations, as well as diversifying into many other lines.

This is bringing a different character to the fish trade in the United States. These firms have adequate access to capital—which was always a bottleneck to growth in the fish trade. They think in national terms in selling and in international terms, for the most part, in overall business. For the most part (and especially those in the food business) they are merchandizing oriented and not production oriented. They are accustomed to thinking and dealing in large terms and in the impersonal basis of the family owned business which formerly dominated the United States fish trade.

It has not been customary for a rather long time for large fish firms in the United States to be much involved in the ownership of fishing vessels, although practice differed in different sections of the trade. All sections of the trade, however, practiced, on a more or less extensive basis, the giving of credit to fishermen for seasonal operations, for vessel acquisition, for new vessel construction, etc. With the changing character of the fish trade this practice is diminishing and is likely to pretty well vanish. Finance Committees of large corporations keep a close weather eye on returns of assets employed, or a related auditing statistic, and do not care to have capital tied up where it is not turning over fairly frequently and showing an appropriate earning rate. Fishing vessel capital does not turn over very rapidly and the pay out is likely to be rather longer than Finance Committees or Bank Examiners like. This is becoming all the more the case as fishing vessels become larger, more sophisticated, and more costly to acquire and operate.

Thus, instead of the consolidation of the fish trade into larger and stronger hands being a direct and immediate boon to the U.S. flag fishing industry the contrary is more likely to be the case. Up until recently the fish trade has had a certain paternalistic relationship to its fishermen-boat owners. In any event when the going got tough enough the boat owners could go directly to the top man in the firm he supplied with fish and state his case to a sympathetic person who knew his end of the business, and if he was a good fisherman he could expect to get as much relief from the person from whom all power in the firm flowed as seemed reasonable and could be given. It also has not been unknown, in the tuna trade at least, for boat-owners to group together and help a firm that they fished for over a tight credit spot by loan, deferment of fish payment, or decrease in fish price by one means or another. This sympathetic give-and-take between processing firms and their fishermen suppliers has been a convenient shock absorber in this volatile and uncertain business. It is rapidly disappearing.

Many of the large firms now coming into controlling position in the fish trade have extensive holdings in other countries, or extensive holdings outside the fish trade in this country. They will buy raw material to their quality standards from wherever in the world it is in the steady supply they require at the cheapest price, and sentimentality or paternalistic feeling will have little to do with it. Those who deal otherwise in the same market with them will do likewise or they will fall by the wayside.

There is much talk among national planners, not much acquainted with the fish trade, that the incursions of these firms into the U.S. fish trade will lead to an integration of the fish business from the ocean to the consumer's plate with much emphasis on system analyses, etc. There is nothing in recent history to indicate such a trend, and much to indicate a contrary trend toward further divorcement of fishing vessel ownership and operation from processing and merchandizing of fishery products. The only exception apparent to this is a trend to integration, automating, and systems planning in the fish meal industry of the Gulf of Mexico.

Another tendency noted in this changing picture is the trend to emphasis on products having national distribution capable of being obtained in large volume with broad customer acceptance, with resource base some place in the world adequate to permit substantial market growth, and products having stability of supply. Indicated is a further trend to such products as tuna, shrimp, fish blocks and its products, and fish meal. Should fish protein concentrate ever develop as a commercial product it would fit in this category.

Another factor of major importance is that these large firms by and large are opposed to trade controls, tariffs, etc., because of the international nature of their total business. Thus domestic fishermen can anticipate more opposition from fish processors to barriers to the flow of fish products in international commerce than, even, has been the case in the past twenty years.

Another trend would appear to be the impracticability for fishermen's cooperatives to break into these major fish commodity fields in a consequential manner because of the strength of brand in the market, and capital back-up in the business.

Lastly, a continuation is anticipated in the already existing trend toward weaker national and regional trade organizations in the fish trade. Very large

firms tend to rely on their own activities to a greater extent than small and medium sized firms, and place less reliance on day to day activities of trade organizations except in major and rather general fields of activity.

All of this is not to say that these large firms will not improve the status of the United States flag fishing industry. They very likely will do so by providing increase in total market, stability in supply—demand relationships, and the enforcement of efficiency on those suppliers who survive. It is very likely that the final elimination of the padrone relationship between processor and boatowner will be a positive long term boon to the latter. But it will be different, and the adjustments will be considerable, with some being painful.

D. The resource base available to United States flag fishing vessels

Of course, strictly speaking, any fishery resource in the high seas of the world ocean that is available to Russian, Japanese, or other, fishermen is also available to U.S. flag fishing vessels.

Expert opinion on the extent of underdeveloped resources of the world ocean is variable both because of inadequacy of precise information, and because of different criteria as to the size and character of the animals to be harvested. Generally speaking there is fair agreement among experts that the sustainable yield of the world ocean of the kinds and sizes of animals now harvested, without any major technological change, would be in the range of 200–250 metric tons per year, or 4 to 5 times that now harvested. If reasonable management practices are used, reasonable progress in technology is continued, and economics permit the use of smaller animals (in the range of 1 to 5 inches length) for fish meal and fish protein concentrate as well as for more traditional fish and shellfish uses, estimates range from a sustainable annual harvest of 1,000 to 2,000 million metric tons. More extensive aquaculture could expand both of these sorts of estimates. Neither of these estimates are very precise yet, because of limited knowledge of the ocean and its resources. It is safe to say, however, that reasonably good management of the harvest of known resources of a traditional nature will permit an expansion of world fish and shellfish production by 4 to 5 times the present levels, which should provide for expansion needs for the next twenty years at least, and perhaps forty.

While these are mostly legally open to U.S. flag fishing, practical circumstances limit this in most high seas fisheries and will continue to do so unless there is marked change in United States policy and actions in this field, which is not realistically capable of expectation in the near future. Essentially the reason for this is that if the United States Government does decide to broaden and strengthen the ability of its marine fishermen to produce in any small measure of the way it has provided incentives to its farmers and petroleum producers, there are such large underutilized resources available in U.S. coastal waters that increased production efforts would center there for a generation to come. Tuna and shrimp provide exceptions to this to some extent, which are treated elsewhere in this report, as do trawl-caught groundfisheries of the North-west Atlantic, but the above statements are generally true.

Another reason is that the situation of Russian, Japanese, and United States fish business in the outside world is quite different. Both Russia and Japan have as major objectives of their world-fishing policies the conservation or earning of foreign exchange. Thus they wish to use their own labor and their own flag-vessels as far as possible so as to maximize the area of the business within their own currency. This has not been a factor with the United States at least since 1945, and really not for more than 100 years. It has preferred, and particularly for the last twenty-five years, to have fishery earnings bolstering the economies of foreign currency areas.

Additionally Japan and Russia have had trouble steadily in getting foreign bases out of which to operate close to the fishing ground. United States fish firms, in contrast, have not been under United States urging (or provided with incentives) to keep production for the United States within the U.S. currency area, to use United States labor in foreign ventures, or to export capital to invest in foreign ventures. Consequently United States industry has been broadly welcome to come in and develop fisheries in foreign countries, using native flag vessels, native labor, and involving native capital with equity either in joint venture firms, totally U.S. owned firms, or totally native owned firm. This pattern seems likely to continue for the near future, so that U.S. firms will be stimulating fisheries out of foreign ports rather than those using U.S. flag vessels for wide-flung operations in the geographic term.

Accordingly, it is useful to examine most closely the estimates of marine living resources suitable for supporting fisheries supplying United States markets that are available in U.S. coastal waters, or close thereto. The knowledge respecting such resources has been reviewed recently by appropriate experts for the "Conference on the Future of the U.S. Fishing Industry," held at the College of Fisheries, University of Washington, Seattle, Washington, in late March, 1968. A tabulation summary of this information is given in Table 12. This can be summarized further as follows.

1. In the shelf and slope area adjacent to the United States there are known resources of the sorts of fish used in the United States that are conservatively estimated to be capable of supporting annual harvests on a sustainable yield basis (if properly managed) of about 22 million tons of fish and shellfish per year. These estimates can be divided roughly into 8 million tons per year of demersal (bottom) fish, 10 million tons of pelagic fish, and 4 million tons of shellfish.

2. The largest blocks of underutilized fish and shellfish resources exists in the Gulf of Mexico, with some along the South Atlantic coast of the United States. These may be able to support annual fisheries of 13 million tons per year.

3. Pelagic resource potentials suitable for making fish meal, fish protein concentrate, etc., in addition to those now used, are particularly large in the Gulf of Mexico and off Southern California (6 million tons per year).

4. Demersal (bottom fish) potentials in the Pacific Northwest, Alaska, and New England are large (4 million tons per year), but much of the potential is currently being harvested by foreign fishermen.

5. Pink shrimp, tanner crab, and scallop show particular promise in the Alaska area, as do clams. Calico scallops and clams are in large underutilized supply in the Gulf of Mexico and along the South Atlantic sea bed (4 million tons per year).

6. In essence, these reviews indicate that there are resources of fish and shell fish available on the continental shelf and slope, of the sorts capable of being marketed in the United States, that can support on a steady, sustainable basis (if their harvest is rationally managed) annual yields in physical volume about 8 to 10 times that now produced by U.S. flag vessels.

A little more than 2 million tons per year of these is now taken by U.S. flag fishing vessels and at least half that amount is taken now per year, in addition, by foreign fishermen. Straight arithmetic would indicate the possibility of increasing yields by a factor of 6 or 7 from present levels without interaction between fisheries or nations, but the situation is by no means so simple.

Some of these resources are presently fully utilized and under international or other conservation regulation (Pacific salmon, Pacific halibut, Alaskan king crab, Maine lobster, Pacific yellowfin tuna, etc.). Generally speaking these are the resources of higher individual value where scientific information is good enough to permit rational regulation of effort. Some of these resources are a little, some, or have been heavily, overfished and are not under rational management procedures yet, either because of lack of scientific knowledge as to what to do, or lack of agreement or machinery therefore to do what is needed. Included are Atlantic haddock, Atlantic silver hake, Pacific mackerel, Pacific sardine, etc. Some of these resources have just had their harvest and environment so badly managed that they do not produce well any more (oysters, many clam resources, Atlantic shad, Atlantic salmon, etc.). Some are so heavily regulated for no resource justification at all that a fishery cannot be economically initiated on them (Gulf of Mexico thread-fin herring, California anchovy, Alaska Herring, etc.).

These various situations are so complex, and so different one from another that a number of them are discussed separately in the following chapter. Nevertheless it can be stated flatly, and without fear of contradiction, that there are very large underutilized living resources on the continental shelf and slope of the United States, easily available to United States harbors and flag vessels which are of the kind required by the United States and the world market.

It is not contended that all U.S. fishery market needs can, or will, be filled from them, because of the variety of U.S. market requirements, some resources of which do not occur off the United States in sufficient quantity for that market. What is contended is that if the United States followed a general policy along the lines followed by Japan of providing incentive to domestic fishermen to more fully utilize coastal resources, the living resources in U.S. coastal waters are more than adequate in size to fill the equivalent of the total U.S. market for fish and shellfish products (about 7 million short tons per year) and provide more than twice that much in surplus for export.

Some of the situations of the specific United States fisheries are discussed in the following chapter.

CHAPTER III.—SPECIFIC U.S.-FLAG FISHERIES

Table I contains the annual catch of U.S. flag fishing per year from 1926 through 1967, their annual value, and the average price per pound paid the fishermen in the particular year. Table 2 gives the relative volume of the catch by species, or species groupings, in 1966, (the last year of full published record) as well as the year (and amount of catch) which contained the highest yield for that species or grouping. Table 3 arranges these data for 1966 in terms of value.

These three Tables illustrate in a bare bones manner the recent history of U.S. flag fishing and its current status but the data thus unadorned do not illuminate history, nor describe status adequately to form the basis for policy or to indicate the elements of a strategy which would improve the current status.

While the annual total catches given in Table I describe an almost static condition in the U.S. flag fisheries for the thirty year period from 1934 to 1967 the fishery, to the contrary, has been, and is, exceedingly dynamic. Species, and species groups, have come into the fishery from time to time. Some have continuously grown in the fishery. Some have waxed and waned over the years. Some have grown great in production and the faded out of the fishery entirely. Only by an understanding of what has happened to the major warps and woofs, and the reasons for these occurrences, can the existing fabric be understood or a more perfect one designed. Some of the more important elements of these exceedingly dynamic movements are briefly set out below.

(1) *The Pacific Sardine or Pilchard.*—The first species to be considered illustrates one of these points well. The Pacific sardine began to form the basis of a commercial fisheries in southern California after the turn of the century. Under the stimulus of World War I it grew in size, chiefly to provide canned food for the then existing emergency. It reached a high level of 161 million pounds of yield in 1918. After a brief recession at war's end the fishery grew again under the residual stimulus of the canned sardine market that had developed, and the new stimulus of the chicken industry that had found fish meal to be an efficient additive to chicken feed to produce eggs and meat cheaply. The fishery grew steadily, became important in British Columbia, was started in Oregon and Washington in 1935, and in 1936 reached the peak of its production, when it contributed 1,502 million pounds to the United States fish catch and 1,593 million pounds to the entire Pacific coast catch including Canada. It was the largest single species fishery developed by the United States to that time.

The catch decreased each year from that date. In 1948 the British Columbia fishery (which had begun in 1918) ceased completely. 1949 was the last fishing season for sardine in both Oregon and Washington. The Northern California (San Francisco) fishery stopped in 1951. The Monterey fishery, which had harvested as much as 500 million pounds in the war season of 1941-42 (and supported famed "Cannery Row") was out of business completely by 1960, having subsisted for the last few years on fish trucked from Southern California. The Southern California fishery dragged on yet for a time, gravitating down to a harvest of less than one million pounds per year, taken incidentally to other fisheries. At last in 1967 a five year moratorium was legally placed on any landings of this species in California aside from those caught accidentally in other catches. A fishery yielding in the neighborhood of 30 million pounds per year remains in nearby Mexico, mostly supported by a southern race that had not been much affected by the California and other west coast fishery. It is probably now being over fished by Mexico.

There was no managerial system available with which to apply the available scientific knowledge and there still is not. The Federal Government assumed, nor asked for, no regulatory responsibility. Regulatory responsibility in the State of California was split between the California Fish and Game Commission and the State Legislature, and it still is. The Pacific States Marine Fishery Commission, whose establishment was strongly motivated by the crisis in this declining coastal fishery, had no regulatory power.

By 1946 the situation was so critical, and somewhat puzzling, that the remaining industry sought increased research on the problem by the Federal and State of California Governments and the University of California, including new taxes on the fish catches to help support the research. The expanded research program began in 1948 and has continued every year since in exemplary

fashion. A favorable ocean climate regime in 1957-58 produced a good year class that revived the fishery to yield a high of 207 million pounds in 1958, but in the absence of any regulative machinery the remaining fish effort was large enough to drive the stock right on down again.

Thus the largest U.S. flag fishery in terms of volume existing in 1937 had completely disappeared from the record of United States fish catch in 1967. As will be noted further on, scientific evidence is now adequate to provide means of relief and recovery, but the political machinery with which to put this new knowledge into effect does not yet exist at either the State or Federal level.

(2) *Menhaden*.—Menhaden occur in commercial quantities from the Canadian border to the Mexican border on the Atlantic and Gulf of Mexico coasts. They are not used for direct human consumption. They are used for producing fish meal and oil. There has been a fishery on them since colonial days which has been of substantial size since the 1870's. The fishery along the Atlantic coast, particularly in the middle region from New Jersey to North Carolina, developed steadily since World War I to be the largest volume fishery of that region. With the decline in the Pacific sardine fishery (with whose products it was in partial competition) the fishery grew sharply and since 1945 has been the largest fishery of the United States in terms of volume of production. The fishery spread to the Gulf States on an important scale after World War II. It reached its peak of total U.S. production in 1961 with a yield of 2,290 million pounds (round weight).

The menhaden fishery is now following the same down hill path as did that for the Pacific sardine. The annual production on the Atlantic coast has been falling off steadily during this decade and is still doing so. The incoming year classes are smaller. The five year average (1959-63) of production on the Atlantic coast was 1,406 million pounds and for the Gulf coast 927 million pounds. In 1967 Atlantic coast production was 466 million pounds, and Gulf production was 700 million pounds. Thus overall landings were off by more than 40% from 1961 and Atlantic production is down even more proportionately. 1968 production, particularly from the Atlantic, will be down further, although Gulf production appears to be holding about even.

The menhaden industry stands high among the fish meal industries of the world in application of science and technology to catching and processing of fish. Plants, vessels and gear are kept modernized and in good shape. Profits, until very recently, have been relatively good and capital availability has not been a substantial problem. The use of its product, fish meal, has been soaring in the United States during recent years. The problem of the industry has been almost solely a decrease in abundance of the resource upon which it depends. World market surpluses have been a temporary nuisance, decreasing earnings for a time in 1959-60, and again in 1966-67, but it was decreasing resource in the last down swing in world price that really hurt the past three years, because it raised cost per ton of production.

The research situation on decline of menhaden is not as clear even as it was on California sardine. The several east coast and Gulf States involved do not have strong ocean research arms and the Federal Government has not had a sufficient menhaden research program to set the scientific record clear.

Accordingly the cause of decline in menhaden cannot be stated clearly even as could have been that for the Pacific sardine. There may be adverse ocean climate conditions on the Atlantic. There may be an adverse effect on eggs and young from estuary pollution. But the best bet is that overfishing is to blame.

It is of no consequence what the reason is. As with the Pacific sardine there is no regulatory machinery so that modern resource management methods could be applied if it was known for sure what was to be done. The individual states are not equipped to handle such a problem. The Atlantic States Marine Fisheries Commission and the Gulf States Marine Fisheries Commission are not from the management viewpoint. The Atlantic Marine Fisheries Commission was recently given regulatory power over the menhaden fishery in the Atlantic area by its member States, but only on the grounds that management decisions be taken by unanimous agreement. So far Virginia has not agreed to suitable regulations to stop the decline in resource. The Federal Government does not have regulatory jurisdiction nor management responsibility, nor has it very avidly sought it because of the political implications.

As a consequence the second major ocean fishery resource of the United States is headed down the spout with no relief in sight. The collapse of the Pacific sardine resource set up interactions between conservationists and commercial

fisheries which have not yet been possible to overcome in California, and a second occurrence of the same nature with respect to menhaden will set back fishery development possibilities in coastal United States waters by another generation. It seems certainly to be on the way.

(3) *Oysters*.—There are three sorts of oysters harvested in the United States, the eastern oyster, the western Oyster, and the introduced Pacific (or Japanese) oyster. The total production of oysters in the United States in 1967 was 57.7 million pounds. This is about $\frac{1}{2}$ the recorded production of 1880 (152 million pounds), for the east and Gulf coasts alone, or for the whole U.S. in 1908 (152 million pounds) which was the first year of complete national survey, or about half the catch (117 million pounds) recorded for Chesapeake Bay alone in 1880.

The eastern oyster has always been the largest producer. It was even farmed on the Pacific Coast with modest success for some years in San Francisco Bay before it became too polluted (2.5 million pounds having been produced in California in 1899). The decline in its production has been quite steady since records began to be kept. The clearest case is in Chesapeake Bay where the catch has gone quite steadily down hill from 117 million pounds in 1880 (the first year of record) to 21 million pounds in 1965 (the last). The Middle Atlantic catch shows much the same course, having been 28 million pounds in 1880, 29 million pounds in 1887, and then declined rather steadily to 756 thousand pounds in 1965. The New England catch shows the same picture but on a slightly different scale. Production was 4 million pounds in 1880, rose to 27 million pounds in 1910, and then (except for a small revival in 1935–37) declined steadily to a third of a million pounds in 1965.

The causes have been various. Over harvesting of wild stock and destruction of native shell beds is undoubtedly the largest single cause. Regulation of this in the several states still ranges from odd to weird. The colonies of Maryland and Virginia were arguing over the proper way to harvest oysters from the Potomac River estuary before the Revolutionary War, and they still are.

Estuarine pollution has been a major problem, ranging from human wastes from the cities rendering the oysters inedible from the health standpoint to industrial pollution killing the oyster beds outright. Waves of disease have depleted wild beds and damaged farmed beds. It is not certain that these epidemic diseases are not related to estuarine pollution.

There is no general tideland tenure program in the East coast and Gulf States favoring the farming of oysters as practiced in Japan, Western Europe and the Pacific Northwest, although such practices have been introduced with success in a few places.

The history of United States resource use has produced few instances of natural resource wastage more flagrant than that of the eastern oyster. Even San Francisco Bay (where its cultivation was introduced after gold rush) is too polluted and changed to warrant its cultivation there any longer.

The delicious small western oyster was never a big producer (3 million pounds in 1892) and it was quickly cleaned out of most of its natural habitat. It has not been seen in Willapa Bay, an original large producer, for thirty years. It also suffered greatly from pollution, silting and other changes in its estuarine environment. For fifty years it has been the object of small scale, but lucrative, farming in southern Puget Sound, which waged continuous battle for thirty years with pulp mill pollution to survive. Production runs at less than 40 thousand pounds per year in recent years. When the pulp mill at Shelton, Washington, shut down from general economic causes, only then did that damage repair.

The Pacific oyster was introduced for farming in the State of Washington after World War I, and into Oregon and California within ten years later. Production has been as high as 13 million pounds per year (1946) and was 5.9 million pounds in 1967.

There is great talk about the future of mariculture (and particularly oyster culture) in the United States, and the need for research to stimulate its growth. Sophisticated oyster culture has been practiced in the United States for fifty years. American oyster farmers and scientists are in close touch with their Japanese colleagues and quite aware of the most modern technology and its economics. The oyster market in the United States is strong. Decrease of natural harvest and lack of substantial growth in farmed production is not due to lack of science or technology. It is due to estuarine pollution, silting and other changes; to lack of appropriate land tenure rules in most states to favor mariculture; and lack of good resource management techniques, well known, in regulating the harvest from remaining wild stocks. Governmental mechanism in the United States simply is not suited to the use of modern aquatic resource management methods and techniques.

(4) *Atlantic Ocean Perch*.—The landings of Atlantic perch illustrate most clearly a fishery coming into prominence and then dying away in a relatively short term of years. The species was largely ignored for economic reasons prior to 1930 and only began to come into prominence with the inception of the marketing of frozen fish fillets in the United States. The landings exceeded a million pounds first in 1934 and grew steadily and rapidly to a high level of 238 million pounds in 1948. It then declined steadily to a new low of 81 million pounds in 1966.

The decline in catch came during a steady growth in the market for frozen fish fillets in the United States. It arose from two factors. Atlantic Ocean perch is a slow growing fish that reaches considerable age. The growing fishery creamed off the standing stock as well as the annual growth increment in its early years and reduced the available stocks in waters adjacent to the United States. Although some overfishing probably took place, this was not the serious problem that existed in Pacific sardine or is growing in menhaden.

The more important reason for decline in production after 1948 was competition in the market from the same or similar product produced in the Canadian Maritime provinces from essentially the same resources. Growing support for the Canadian fisheries from the Canadian Federal and provincial governments, and slackened market protection and support for the New England fishermen from the United States Government, made it possible for Atlantic Ocean perch fillets to come into the U.S. market and increasingly take it away from the New England fishermen.

(5) *Atlantic cod*.—The Atlantic cod contributed 128 million tons to domestic landings in 1938 and only 43 million pounds in 1967. This is not the whole story with cod, and its story is different than that of the other major, or formerly major, species in the landings of U.S. flag vessels.

Cod was the mainstay of the New England fishery during the eighteenth and nineteenth centuries. The highest recorded catch (294 million pounds) occurred in 1880, the year of the first general fishery census in the United States. Although cod were, and are, commercially abundant off New England, its center of abundance and ease of catch is eastward on the Nova Scotia Banks, the Grand Banks, around New Foundland and up north and east. In these early days cod fishermen out of New England ranged as far east as Iceland on occasion, as far north as Labrador rather normally, and fished most actively on the Grand Banks. The catch was almost all salted and dried and, besides being an important item of the domestic diet, was a valued item in the export trade of New England.

The gradual decline in favor of salt cod in the United States led to catch declining from its average U.S. catch level of about 170 million pounds per year during the 1890's to an average yield of about 140 million pounds per year up to the outbreak of World War I, and an average of perhaps a little less than 100 million pounds per year from its end up through the depression of the early 1930's. From 1933 to 1939 landings increased to an average of 120 million pounds per year under the stimulus of the beginning frozen and fillet production. In only two years after 1939 did the catches exceed 100 million pounds, and these were the war years. The landings of cod by U.S. vessels has declined rather steadily since war end and is still doing so, having reached 43 million pounds in 1967.

This decline has nothing to do with market for cod in the United States. Cod has become a standard ingredient of the rapidly growing frozen fish block business. These are imported from Canada, Iceland, and Norway especially in large volume. The United States eats the round weight equivalent of at least 400 million pounds of cod per year presently, and probably more. It is a prominent part of the fish sticks, fish portions, fish sandwiches, and fish steaks that are so popular presently in the United States.

The decline in harvest has not been materially affected by decline in resource abundance, although some has been apparent in the last few years. There are presently caught about 1 million short tons of cod per year in the northwest Atlantic, and the United States fishery has become eighth or ninth in size among the nations fishing there, instead of first as it was during the eighteenth and nineteenth century.

It is simply that other nations, and particularly Canada, can catch cod, fillet them, freeze them into blocks of fillets, and ship them into the United States cheaper than New England fishermen can economically survive at doing the same.

(6) *Haddock*.—Haddock have also been caught in the New England area since colonial days. Unlike cod they were mostly used for the fresh market in the early years of the fishery, and the catch did not reach a level of 100 million pounds per year until 1919. The initiation of filleting and packaging of haddock,

and the increased use of refrigeration after World War I, led to a rapid increase in the landing of haddock as its sales became more nation wide. They reached a top level of 294 million pounds in 1929. This appeared to be somewhat more fishing pressure than the stocks would stand and landings, but not market, fell off rather steadily during the following fifteen years, to level off at about 150 million pounds per year.

Haddock did not suffer from the influx of frozen fillets and blocks that began after the end of World War II as did the cod fishery. Haddock, while found commercially to eastward, has its center of abundance on George's Bank off New England. This is not quite as easy for the Canadians to get at as for the New Englanders. Haddock had the market for fresh fish in the New England and Middle Atlantic area which stayed more or less steady. Consequently haddock became the income mainstay of the otherwise distressed (except for scallop) New England ground fish fishery and catches have vacillated in a fairly narrow range of 130 to 160 million pounds per year for the past twenty years, the vacillations being as much a matter of varying strength of year classes entering the fishery as anything else until the last few years, when a new factor entered. Beginning in the early 1960's the Russians began to fish very heavily on Georges Bank and the Canadians to fish more heavily there. There has been definite and heavy over fishing in the last few years. This has been accompanied by poor incoming year classes for the past four years, possibly connected with the over-fishing. The machinery of the International Northwest Atlantic Fisheries Commission has not yet been able to deal with this overfishing problem effectively. Consequently the population is in poor condition and the economics of the New England fishery are bad. The New England catch in 1967 was only 98.5 million pounds.

(7) *Pacific Mackerel*.—The Pacific mackerel has been fished commercially in Southern California since the turn of the century. It has been subject to rather wide fluctuations in abundance associated with changes in ocean climate and their affect on the size of year classes entering the fishery, not unlike the Atlantic mackerel. The fishery reached a peak of production in 1935 when 146 million pounds were landed. There were two years since that (1936 and 1941) when landings equalled or exceeded that level. Otherwise there has been a rather steady decline in production in spite of a decrease in total amount of fishing effort available in the area. In the last three years, in particular, the decline has been sharp, and in 1967 only 2 million pounds were taken.

The decline appears rather clearly to be of a biological nature and related to a fishing pressure possibly too great for the existing stock to sustain. It is not clear, however, that competition at young stages from the enormously increased anchovy population has not been a factor of critical importance. For the same reason as noted above under Pacific sardine nothing is being done about this. In the State of California the regulation of marine fisheries is split between the legislature and the Fish and Game Commission, with the result that there is no mechanism available for managing the fishery in accordance with the scientific evidence and well known modern management procedures. The Federal Government has no managerial responsibilities in the area, chiefly because it has not asserted it. Almost all mackerel fishing is done outside the 3-mile limit of State waters.

(8) *Jack Mackerel*.—The situation of Jack Mackerel in California is quite different than that of Pacific mackerel in the same area. The stock is known to be quite large in relation to the fishery and to be underutilized. Nevertheless the catch has shrunk from a peak landing of 146 million pounds in 1952 to landings of 41 million pounds in 1966.

The reasons for the decline are economic and they are several. The main one is the decay of the Pacific sardine fishery and the gradual disappearance of the large fleet of local purse seiners that lived on it. This fleet formerly caught jack mackerel as a side-line seasonally, and as a side line they could afford to catch it rather cheaply. With the decline of the sardine resource these vessels required to live more and more on their jack mackerel catches. Because of this they required a higher price for their mackerel catches. At the same time that this rise in price of raw material for canning was going up the market for cheap canned fish in the United States was decreasing. The consequence of the two movements in opposite directions were that jack mackerel have just been priced out of the only market they have except for fish meal and present raw fish prices are far too high for that. An economic factor of perhaps even greater importance is that there is wide variation in availability of jack mackerel to the remaining fishing

vessels, which arises from environmental variation. The remaining vessels are too weakened economically to range further from port for catch, or to equip themselves with modern search and capture gear with which to follow the fish when they move out, or down, from their accustomed area.

There is presently some resurgence in demand being felt from the growing market for pet food, but so far it has not had a material effect on landings because the fishermen have not been able to supply existing market on a regular basis. The vessels left in the mackerel fleet are few, old, and small. They are not very effective catching instruments anymore.

(9) *Pacific Herring*.—Pacific herring is another fishery that has shrunk sharply in production in the past 30 years. It reached its peak of production in 1937 when 263 million pounds were landed (almost all in Alaska). The yield from the fishery has declined steadily from that time until in 1967 only 16 million pounds were landed. As with the jack mackerel the reason for the decline is economic and not resource connected. Changing taste patterns removed the original salt herring market this fishery originated to fill. The fishery was always marginal economically in the fish meal business through problems associated with high labor costs, transportation costs to market, and cyclic variability in herring availability near plants. The massive incursion of Peruvian fish meal production into the world market after 1958 finally put an end to the fish meal business in Alaska for the time being.

The major factor, however, has been regulations placed on herring fishing for reduction by the salmon trollers who mistakenly believed that the herring fishery adversely affected the landings of their fishery, because Chinook and Silver salmon eat herring. They also eat any kind of fish available and there is no shortage of food available to them aside from herring. Nevertheless state regulations in California, Oregon, Washington and Alaska were obtained which eradicated the herring reduction fishery. There was not enough strength in the reduction industry to fight off these nonsensical State regulations.

(10) *Salmon*.—The Pacific salmon fisheries are supported by five different species of fish. They have different life histories and biological characteristics. They have different texture, taste and appearance characteristics and thus different markets. Chinook and silver salmon take lures readily and are among the most famous and favorite of sport fish; chum and sockeye salmon more rarely do and are not much the object of sport fishing; pink salmon sometimes take lures readily and sometimes do not. The five species are caught in different proportions by different types of commercial gear. They make long migrations in the sea and have been persistent causes of interaction among Russia, Japan, Canada and the United States. They migrate up rivers to spawn and create problems with power dams, irrigation diversions, and other fresh water uses. Everything connected with the Pacific salmon and the fisheries based upon them is complex and controversial.

There are few groups of animals that have been so long the object of detailed biological research at such a level of intensity, yet their behavior and population dynamics are still so uncertainly known that conservation management is still carried out as much by hunch and empiric observation as by scientific deduction. There are no other kinds of fish which have been for so long so fully under conservation management as these. The conservation management is so tight in all aspects of the salmon's range as to create many economic wastes. Much of the regulation is quite frankly for social rather than biological reasons, for there is no sort of fish that rouses emotions in the electorate such as these.

In spite of every sort of maltreatment of the resource that multiple use of waters can devise, and every economic abuse that can be thought of to apply to an industry by four state governments, two international commissions, one interstate commission, the Federal Government and scores of biologists and administrators, all five species of salmon persist throughout their entire original range, keep up volume of production fairly well, and alternate with tuna from year to year as the second most abundant fish landed by U.S. flag vessels after menhaden, and the second most valuable after shrimp. For many years taxes on their production formed 80% of the revenues of the Territory and State of Alaska, and they are still of crucial importance to that State's revenue and of substantial importance to Washington, Oregon and California.

For many years the primary use of salmon in the United States market was for canning, and canned salmon dominated the United States canned fish market as well as being an important export item from the standpoint of value. Canned salmon has declined in production rather steadily for the last thirty years as canned tuna production has increased. In 1953 canned tuna overtook canned

salmon in terms of volume consumed by the United States, and has gone on to a level where it presently is about double that of canned salmon.

The canning of salmon is still decreasing, and it will probably continue to do so far some time yet. This is not attributable to lack of plant efficiency or marketing effectiveness, but mostly to changing transportation patterns. All of the Pacific salmons, especially when caught in the sea, are among the most delicious of fishes, are relished in the fresh or frozen form, and command much better prices in those forms than in the canned form. The general rule of the thumb in the salmon business is to never can fish that can be sold frozen, and never freeze salmon that can be sold fresh. Like everything about salmon even such a general rule of thumb is contentious and not always correct.

Both air shipment and containerized refrigerated shipment are rather rapidly changing the pattern of salmon use by making it possible to get the product from the ocean to the consumer at a price and in a condition that will demand higher value. Air shipments of fresh fish from even as far north as Nome, Alaska, and particularly from Anchorage, are becoming more common both to Europe (where demand is very strong), and to the United States both East, West and Central, where well taken care of salmon sells at high value with strong demand. Air shipment of ocean fresh salmon from Seattle to East coast markets has begun, and will undoubtedly increase steadily. This air shipment of salmon in the fresh form from catching location to luxury market is already substantial and can be considered to be only in its initial stage.

The use of refrigerated vans to ship frozen salmon from isolated catching locations to more centralized locations for further processing is affecting the salmon trade even more profoundly than is air shipment because of the larger volumes involved. It is also resulting in a more effective use of the salmon resource for the reason that it makes possible the effective use of runs of salmon into many small coastal streams (particularly in Alaska) whose salmon runs were too small and too sharply peaked seasonally to support a steady salmon cannery.

These changing trends in the salmon trade do not mean a demise in salmon canning because in several places (such as Bristol Bay, the Fraser River, Cook Inlet, Prince William Sound) the large salmon runs coming into spawn peak so sharply that they cannot be handled effectively in any manner except by canning. It does, however, mean continued shrinkage in the relative importance of canned salmon in the fish business and this will continue to create social and economic readjustments that will be troublesome politically in the affected states and with the Federal Government as well, in both the domestic and international policy spheres.

These changing trends have, despite changes in physical volume of salmon produced, kept value up. The record year of catch of salmon was 1936 when 791 million pounds were landed, but the record year of value was 1965 when only 327 million pounds were landed. Quite aside from inflationary effects, there has been a rather steady upgrading in end use of salmon which has increased the value of his catch to the salmon fishermen. This seems likely to continue.

There is considerable scope for increasing the total catch of salmon from wild stock. This will not be through the discovery of new stocks. All stocks of Pacific salmon are known and most are fully utilized, as well as a few being overutilized. Improvements in resources management practices are becoming practical with advancing research, and these are being made slowly. Rectification in access by salmon to spawning beds by removal of obstacles, and even improvements in spawning area, are possible and being practiced. Improved practices by the International Pacific Salmon Fisheries Commission on the Fraser River, and by the Canadian Department of Fisheries on the Skeena River, have been particularly rewarding and are slowly being applied elsewhere, particularly in Bristol Bay rivers, with what appears to be some success. Increased total production from these activities is unlikely to be spectacular but it can be substantial. It is not beyond reason to speculate that the total sustainable yield of salmon from wild stock could be increased by a half through such means, and a doubling is not entirely ruled out. The scientific, technical, political, economic and diplomatic problems to be overcome in doing this are substantial, as are the social problems of simply keeping encroaching civilization, and other water uses, from further destroying the necessary fresh water habitat of the salmon.

With all of the loose talk now being heard about the possible benefit of aquaculture on food production it is probable that there is nowhere that this could be applied with quicker and more spectacular results than in the artificial propagation of salmon, and steelhead and sea run cut-throat trout as well. Seventy

years of practical experience in salmon and trout hatching and rearing has been had, which, in the last thirty years in particular has been on a large scale and on a continually increasing solid base of both science and technology. Nutritional, disease, and handling problems are well in hand. Enough experience has been had with selective breeding to know that these fishes are genetically plastic and that improved breeds can be developed. The market is so strong that it would accept a doubling of production sooner than it could be had through this means. Increased salmon yields could be a good foreign exchange earner both in Japan and Western Europe for any surplus that the United States market would not accept. The economics even appear to be practical for private enterprise to do this in some places, if legal impediments could be removed.

This does not appear to be likely in the near future. Salmon are deeply engrained emotionally in the social structure of the Pacific Northwest. The most efficient means of harvest have been legislated out of existence in order to spread the wealth among inefficient small scale fishermen. In all the states the waters are public and by law cannot be diverted to private use in the manner required for such fish farming. Steelhead trout, which show particular promise for such large scale fish farming, are reserved jealously for recreational fishing. Competition between remaining commercial gears keeps the political fires so hot that none of these matters seem practically capable of change. This is a pity.

Of all the fisheries none is so ripe for the application of limited entry, or reversion to private ownership, lease of resource control, or other similar device to improve net economic yield. The case of salmon gill-netters in the Frazer River and Puget Sound is particularly in point. No Director or Minister of Fisheries in Washington or Canada has quite the political bravura to tie the bell on this cat.

In any event there is no reason to expect that the value yield of the salmon fisheries will do anything except trend upward, and it is likely that the volume yield will do so slowly also. If even reasonable economic efficiency could be restored bit by bit through slight modification of the existing maze of regulations covering the salmon fisheries the net economic yield from them could be increased enormously and quickly. There is scope for substantial increase in volume of yield through improved resource management practices, and this could be quite large if modification in socio-economic legislation would permit the initiation of privately managed fish farming of salmon and the sea-run trouts.

(11) *Tuna*.—Five species of tuna support the tuna fisheries of the United States. They are yellowfin, skipjack, albacore, bluefin and big-eye. Albacore are caught off the west coast of the United States from Baja California to British Columbia during the summer and fall by small vessels. They provide 30 to 50 million pounds per year. Bluefin tuna are caught off Southern California and Baja California. They provide 20 to 30 million pounds per year. Big-eye are caught to a modest degree in the eastern tropical Pacific and until recently all included in the yellowfin statistics. Small quantities of skipjack and yellowfin are landed in Hawaii, and of skipjack and bluefin on the east coast. The rest consist of yellowfin and skipjack landed almost entirely in Southern California and Puerto Rico, and caught mostly in the eastern tropical and sub-tropical Pacific.

The commercial tuna fishery started in Southern California in 1907 with a small amount of albacore canning. There was no market for it and a new one had to be created. This has gone on steadily. By 1935 the catches required for this purpose exceeded 100 million pounds for the first time. In 1967 they exceeded 400 million pounds (412) for the first time.

This fishery has been in economic trouble for most of its life and yet it has grown in this period to be ordinarily next to manhaden in volume of U.S. landings and next to shrimp (or salmon) in value of U.S. landings. It has long been the largest in volume and value of canned fish items. In 1925 albacore disappeared from Southern California and the industry had to shift to canning the tropical tunas (yellowfin and skipjack), which did not even come as far north as California in commercial quantities in most years. This led to the construction of larger vessels which by 1928 were fishing as far south as the equator. This brought spoilage problems which ice would not solve and means of freezing at sea had to be developed. By 1938 this problem was satisfactorily solved, and the fleet kept increasing in size and range. In 1941 the Navy took over most of the large vessels for service in the Central Pacific.

At the end of the Pacific War the fleet surged ahead again and soon encountered two new problems. From then on to the present time it has been molested by

Latin American countries claiming wide areas of the high seas as territorial sea and attempting to prevent U.S. flag vessel fishing off those coasts, or charging large fees for the privilege. From 1950 on, imports of tuna from Japan caused material economic distress for ten years that not only prevented growth in the fleet but caused some retraction. The Carruthers pack shaper reduced the labor cost of canning tuna so sharply after the end of World War II that American cannerymen gained a good advantage on Japanese cannerymen who still use hand labor for canning tuna. The use of the Puretice Power Blend and synthetic webbing, beginning in 1959, revolutionized the economics of the fishing end of the industry by 1961, and put it again in a competitive position with imported fish. Both branches have so far survived Japanese competition and are strong today. It is not yet certain that the battle for access to resources on the high seas has yet been won by the fishing end. Nevertheless large new investments are being made by owners in new vessels.

From about 1955 on the paths of the cannerymen and boat owners in the tuna industry began to part, with the cannerymen placing increasing emphasis on imported frozen tuna, establishing bases for collecting this in various parts of the world, and stimulating the development of tuna fisheries by South Koreans, Taiwanese, Ecuadorans, etc., as well as by Japanese, on substantially world-wide basis. By 1953 tuna canning by Southern California packers (mostly on imported fish) was well under way in Puerto Rico and this has continued to grow in a solid manner. Some U.S. flag vessels followed the cannerymen to Puerto Rico immediately until in 1967 these landed about 100 million pounds, and will exceed that in 1968. For some odd reason the Bureau of Commercial Fisheries did not, until this year, include these Puerto Rico landings by U.S. flag vessels in the figures given in Tables 2 and 3, which are therefore low. They are now, for the first time this year included in the tables of total supply of tuna to the United States.

By 1958 U.S. flag vessels were exploring the West African coast out of Puerto Rico, as far south as Angola. The growth of this branch of the fishery has been desultory until in 1967 four vessels made successful trips from there. Eight vessels are there as this is written in August, 1968 and it is likely that more will follow before this year is out. Vessels out of Puerto Rico have also explored the late summer tuna fishing as far north as New England and in 1963 the catches for that region were upwards of 14 million pounds, although they have not been maintained at that level. It is likely that there will be renewed interest there this year.

This fishery for tropical tunas (yellowfin and skipjack) has developed into the one real distant water fishery that the United States has. It ranges comfortably and normally throughout the whole range of yellowfin and skipjack from Southern California to Northern Chile and has explored the Atlantic from Angola to New England. The purse seine technique it has evolved is far the most efficient way of catching tuna that any nation has in ocean regions where there is a sharp, shallow thermocline underlain by an oxygen deficiency zone. It is fully competitive economically when fishing in such regions, with any other tuna fishermen in the world, and only Japan catches more tuna than does the United States.

The fleet was quite thoroughly modernized after the purse seine revolution in 1960 put it on its feet economically again. It is presently undergoing further renovation and a very sharp expansion. Fifteen new vessels are under construction or on order and it is likely that this will increase to twenty before this expansion boom is over. The whole fleet is capable of freezing its catch at once at sea and carrying its frozen cargo in undeteriorated condition for weeks, or even months. The new vessels entering the fleet are all substantially larger, and with greater range, than the fleet average just ten years ago. Five of the new vessels are giants capable of freezing and carrying more than 900 tons. Most are over the 500 ton range. Such vessels are equipped to stay at sea for two or three months.

There is one easy way to tell whether a fishery is prospering or not. If it is the fishermen build new boats, if it is not they do not. The individual tuna clippers that have recently been built, or are on order, cost \$1.5 to \$1.8 million each. Thus the total new investment in the tuna fleet now going on will approximate \$30 million. This is all being undertaken by individual fishermen or groups thereof, and cannerymen are involved not in ownership but backing of partial costs in several instances to provide credit for the owners. Some of the vessels have applied for and got Fishing Vessel subsidies from the Bureau of Commercial Fisheries, but more than half have not, on the grounds that it is more trouble

than it is worth. The earning in this fleet is good enough to attract and keep both young and old men. One of the skippers of a large new vessel is 27, and many are in their 30's.

This fleet is presently encountering one old problem and one new one, either one of which can cause serious perturbations in its economics, and both of which could cause serious damage. This has not dampened enthusiasm for new construction, which will increase the fishing effort of the existing fleet by a quarter.

The old problem is jurisdiction by coastal states over fishing in the high seas adjacent thereto. Ecuador, Peru and Chile claim the adjacent high seas to a minimum distance of 200 nautical miles as their sovereign territorial waters. All three have attempted to enforce these extravagant claims from time to time in the past, and Ecuador is making a particularly vigorous effort to do so just now. There is not much the tuna fishermen can do about this. They fish on the high seas not in accordance with rights pertaining to them but in the exercise of rights pertaining to their sovereign, the United States Government. Fishermen are frequently the objects of international law but only sovereigns are its subject. The Department of State has tussled with this problem off Latin America now for twenty years, with varying success. It is renewing its efforts presently, and the issue is in its hands. The Congress in 1954 enacted legislation shifting much of the economic burden of this battle over national rights in the high seas from the back of the fishermen to that of the Federal Government, where it belonged in the first place. The Congress in 1968 has broadly strengthened this economic protection, and stimulated the Department of State to strengthen the diplomatic part of the protection.

The new problem is conservation regulation. Yellowfin tuna stocks in the eastern Pacific will support an annual yield on a sustainable basis of only 180-200 million pounds per year. The available fishing effort is able to catch this much in six months or less. The skipjack population in the same area is large enough to support a much larger annual fishery than now exists on a sustainable basis (it yielded 260 million pounds in 1967). The Inter-American Tropical Tuna Commission has these problems within its purview. Regulation of the yellowfin catch began in 1966 rather too late in the season to be very effective. In 1967 yellowfin fishing (aside from incidental catch) was closed to vessels leaving port after 24 June. The economic effect on the fleet was masked by the exceptional availability of skipjack in 1967.

The fleet is reasonably dependent upon fishing both species for economic success. Skipjack are subject to wide annual fluctuations in availability from natural causes not associated with the fishery. They are normally more available in the second half of the year. Two big years of skipjack availability have never yet occurred together, and a bad skipjack year is not unknown after a good one. The fleet has not yet, until this year, experienced a bad skipjack year with yellowfin regulation. 1968 is one. This is causing a substantial shift of larger and newer tuna clippers from the eastern Pacific to the Atlantic in the last half of 1968. This will create many problems. The industry has had enough experience with such problems that it will very likely survive these.

There is scope in the United States tuna market for substantial increased production by U.S. flag vessels. Imported frozen tuna now supply a little more than half the market. The albacore part of these imports cannot be caught off the United States nor by U.S. tuna clippers, but the bigger half (for light meat tuna) can be caught in the tropics by U.S. flag clippers. Accordingly if U.S. flag tuna vessels can deliver tuna to U.S. canners of equal price and quality with that available from imports there is scope for the fleet to increase in size by another quarter or half under present market conditions. There is no reason to believe that the United States tuna market will not continue to grow.

Perhaps the key thing to watch in the tuna fishery is whether the United States Government is able, or willing, to protect its right for its tuna vessels to fish on the high seas. If it is, the fleet appears to be able and willing to expand on substantially a world-wide basis. In any event this is a large, strong, expanding part of the U.S. flag fishing industry.

(12) *Shrimp*.—The fishery for shrimp parallels in some ways that of tuna. The United States market for shrimp has grown steadily. The fishery is international. It has been bothered by molestation in fishing on the high seas and by imports. It has continued to grow and prosper. It is the most valuable crop to U.S. fishermen, as tuna is the most valuable fishery product at the processed level in the United States.

Shrimp are caught commercially in nearly all seaboard states of the Union but for the past twenty years the fishery has been particularly concentrated on both coasts of Florida, Georgia, and the entire Gulf of Mexico coast. In the Gulf of Mexico has been developed the type of vessel, gear and methodology for shrimp catching that has led the way in the world—the double-rigged Gulf otter-trawler. The fishery has increased steadily in production since the turn of the century, exceeded the 100 million pound level in 1936, the 200 million pound level in 1952, and the 300 million pound level (about 324 million pounds heads-on) in 1967.

The Gulf fishery exists mostly on three species of *Penaeid* shrimp, the white, brown and pink. These have the common characteristic of living only a year to eighteen months so that, substantially speaking, there is no conservation problem as exists with most of the fish referred to above. It is very nearly an annual crop, like cereal, and if not harvested it dies and is wasted. The only thing about this kind of shrimp is that they are found throughout the Caribbean area, and the same species of brown shrimp is commercially abundant off Northern Brazil and in the same latitudes, off West Africa. Smaller species of shrimp (sea bob) are available in large volume in the same region and will support much larger catches than now taken. The large Royal Red (or carabinero) shrimp is found in deeper water (particularly abundantly off West Africa) but is not yet fished heavily.

Most shrimping is done on the continental shelf and in relatively shallow water (mostly less than 50 fathoms). This has brought the shrimp fishermen a different set of international problems than the tuna fishermen have had. Where the continental shelf was broad and reasonably close to American Gulf ports a means of long range fishing developed even with relatively small vessels using ice. A vessel going out to the grounds would take ice for others, and one coming home would carry shrimp for others. In this manner the fishery off eastern Mexico (especially on Campeche Bank and along Tamaulipas State) was developed by vessels out of West Florida, Texas and other Gulf ports.

Instead of exhausting the shrimp stock by increased fishing effort the effect, under normal circumstances, is to reduce the catch by the average vessel. As this goes on the more adventurous fishermen move on experimentally to new and more distant grounds. So long as they are within reach of home port and ice they operate out of home port. When the grounds are too distant to permit this bases are established as possible, in countries closer to the fishing grounds, and freezing plants are erected so the catches can be frozen and shipped home or to market elsewhere in the United States. In this manner the shrimp industry has developed another sort of international character different than that of the tuna industry. Gulf, and other, shrimp operators have, by this means, spread throughout the Caribbean, down the northeast slope of Brazil (out of bases in Barbado's and the Guianas), and U.S. firms have established shrimp fisheries in the eastern Pacific from Guatemala to Ecuador. Probing extensions are going on further south in Brazil and off the West African coast. By providing market, sometimes credit, sometimes other incentives, sometimes through joint ventures, United States firms have been important in establishing shrimp fisheries in the Persian Gulf, off India and Pakistan, and in Indonesia.

This has tempered the attitude of the shrimp industry toward imports because in a good many instances leaders in the Gulf shrimp fishery had one or more boats fishing out of a foreign port whose catches when they reached the United States were classed as imports. Furthermore the efficiency of American shrimpers has always stayed at a level where, except for short periods of time occasionally, they could compete economically against imports.

Accordingly the line between international, foreign and domestic shrimping has never been so clear as in the tuna fishery. Since most shrimping is done within 12 miles of shore there has not even been much of a jurisdictional problem, except with Mexico.

The shrimp business has not been without its ups and downs. As a matter of fact there is a regular cycle of about $3\frac{1}{2}$ years duration where the price of shrimp, number of vessels and catch goes up steadily until there is too much production at too high price. The price, new vessel construction and production then drop for a six month or so period, and the cycle starts all over again. Over the past eighteen or twenty years of this the trend line both of price and consumption has been steadily upward, and it still is.

There is no top yet apparent to the shrimp market in the United States. Consumption double on about a fifteen year basis and does not seem to slack off. As with canned tuna the per capita consumption rate also continues upward.

There is not expected to be a substantial increase (or decrease) in the landings of *Penaeid* (Gulf) Shrimp off the coast of the United States. The resources are quite well surveyed and are felt to be producing about as much as they can. There is steadily developing a larger sized vessel, and freezing at sea has been experimented with extensively (it is used extensively in the Persian Gulf on vessels built for that fishery in Texas) but it is not clear yet that long range shrimp fishing plus freezing at sea can compete economically with ice boats working out of foreign ports where catches can be frozen and shipped by common carrier (or flown). Nevertheless a trend toward larger long-range freezing vessels has looked as if it is starting over the past two years.

(13) *Crabs*.—Crabs have been a delicacy in sea coast towns forever. With the coming of refrigerated transport facilities, and frozen food counters in every super-market type grocery store in every village and town of the interior as well as the coast, the common taste for good shellfish continued to build market in what seems an almost insatiable manner. This is much forwarded by modern packaging, marketing and merchandizing methods, and the rapidity of transport from catcher to consumer, including by air.

Crab have participated fully in this expansion of market with shrimp. In 1965 they were second only to menhaden in volume of landing by U.S. flag vessels (with a total catch of 335 million pounds), and fourth in value (behind shrimp, salmon and tuna) at \$31 million. Both volume and value were new records. In 1966 new records were set with a catch of 372 million pounds valued at \$33 million. The catch was off somewhat in 1967, but will be up again in 1968.

The big volume of production is derived from blue crab, which are found in commercial quantities on the east and Gulf coasts from southern New England to the Mexican border. There is a problem with this kind of crab of the great amount of hand labor in picking meat which keeps production costs up. Catching is by small vessels inshore. Progress is being made in mechanization of processing. Catch has been going up rather steadily. It exceeded 100 million pounds in 1957, and reached 171 million pounds in 1965. There is ample resources base, particularly in the South Atlantic and Gulf States, for major expansion still in the yield.

King crab is caught commercially in Alaska from Kodiak Island to Bering Sea (by Japanese and Russians, to westward, as well as Americans). The American fishery is conducted by large pots on the continental shelf fairly near to shore, but the seas and weather are rough and it is a hardy operation requiring sound, and fairly expensive, vessels to tend the pots.

The American fishery was twenty years getting started and as late as 1959 yielded a little less than 9 million pounds. It then took off like a sky rocket and a veritable gold rush developed. Catches went from 9 million pounds in 1959 to 87 million pounds in 1964, and a top of 159 million pounds in 1966 (almost equaling the blue crab catch of that year). The catch fell to 126 million pounds in 1967 because of resource scarcity but there is not a feeling among experts that the top has yet been reached. Expansion of the fishery in this last eight years has been heavily concentrated close to Kodiak Island, and the stocks in that vicinity have probably reached their maximum level of productivity or surpassed it. There is much stock left that is not fully fished further westward along the Alaska peninsula and out along the Aleutian chain, as well as in Bering Sea. The fishery is expanding out in that direction. The United States Government has jurisdiction over most production, which lies outside the 3 mile limit, but, as is normal, does not exercise it except in negotiations with other countries. Again, as is customary, the State of Alaska fills the management of use void to the limit of its ability.

King crab (as with tuna, brown and pink shrimp) is an example of a marine resources for which no market existed in the United States and for which a market was deliberately created by advertising and skilled merchandizing. It makes a fine canned product but in this form was expensive and directly competitive with the same product from Japan and Russia, where production costs are cheaper. It was not until a solid marketing program was put afoot to sell the product frozen, either in sections or as picked meat, that costs got in line and market expanded so that the fishery could grow.

At once a rather large number of fairly good vessels were needed, and sooner than they could be built. The fishery accomplished its rapid growth by attracting in a conglomeration of vessels, poorly suited to the fishery, from all other fleets on the coast, from tuna clippers, sardine seiners, and salmon seiners to halibut schooners. A good many of them were overage, and none of them were designed for this specialized and rugged fishery, operating under such harsh work and climate conditions. A bad vessel under a good master

however, will accomplish miracles, and this fishery was sufficiently lucrative to attract good skippers. Now that the fishery is becoming mature good vessels newly constructed to its needs are coming off the ways and joining the fleet. In the interim a good many vessels and lives were lost, and a good deal of money was made. A major fishery was developed quickly.

There is another sort of crab in approximately the same area, and experimental fishing results indicate it to be more wide spread and totally abundant than the king crab. It is the Tanner crab (of several species) which the Canadians (who have recently begun the harvest of a similar species on the Atlantic coast) call the Queen crab. Its meat is roughly the same as that of the King crab. It can be caught by the same means as King crab but perhaps will be more cheaply caught by trawl, bottom tangle net, or a redesigned pot. It has not been worked commercially in Alaska until very recently (although long an article of commerce with the Japanese and Russians) because of low return and the fact that the meat was more difficult (and expensive) to pick. There was more tendency in the picking process for meats to be broken, and thus be degraded in value through damage in appearance.

With the decline in abundance of King Crab around Kodiak Island last season the catching and marketing of Tanner crab began in earnest. Sufficient effort is being put on the technological problems of catching and preparation for marketing that these problems are coming to solution. The product is coming on the market in substantial volume in 1968 and it is obvious that the fishery for this sort of crab is going to grow rapidly in Alaska.

Dungeness crab is the third sort (after blue and king) of substantial commercial importance in the United States. It is delicious and commands a good market in west coast cities. It is the crab that Joe DiMaggio's father caught, and that made Fishermen's Wharf in San Francisco famous. Its annual production has averaged in the range 30-40 million pounds for a good many years. This rather localized western market used reasonably the full available resource off Northern California, Oregon and Washington. It provided a price high enough to prevent the extensive canning of this crab but too low to warrant the expansion of the fishery for it to southeast and central Alaska where the large unused resource of this sort of crab exists.

Like the Tanner crab, this crab does not yield as high a ratio of picked meat to live weight as do King crab, and the meat is more difficult and costly to pick than with King crab. As with the Tanner crab, King crab has now created such a national demand for frozen crab meat that with the leveling off of its production Dungeness crab is being seriously worked in the Kodiak area and will undoubtedly assist in keeping the crab gold rush going. There are substantial underfished resources of this crab available in the Gulf of Alaska.

The flourishing of the King crab fishery in central and western Alaska injected a whole new breath of life (and a good deal of money) into the U.S. bottom fish (demersal) fishery of the Pacific Northwest. As is always the case, when fishermen make money they play it back into new and better boats; when there is a market that will show a profit dealers, processors and marketers move in with speed, capital and marketing know how; and when there is better money to be made at sea than ashore vigorous young men recruit to the fishery and give it life. All of these things the King crab fishery has done to the Northeast Pacific ground fisheries, and the effects are now beginning to spin off to other large resources in the area, such as Alaska pink shrimp, scallop, Tanner crab, Dungeness crab, etc. It will eventually infect the major resources of demersal fin-fish that only the Russians and Japanese are fishing heavily in the area now.

(14) *Flounder and the Trawl Fisheries for Groundfish.*—Flounder is the name given to a large and varied family of flat fish that are common to the continental shelves of the North Atlantic and Pacific. Some species are so particularly delicious that they have generated their own trade names (English sole, Dover sole, black back or yellowtail flounder, fluke, rex sole, etc.). For the most part, however, they appear on restaurant menu's in the United States as fillet of sole. The larger species (common halibut) are often steaked and find a ready retail market for home use as well as in restaurants.

The price of flounders is kept high enough by this restaurant and home trade that they seldom can form the raw material for the burgeoning market for "fish blocks" from which are made fish sticks, portions, chips, sandwiches, etc. This caused extreme dissatisfaction among Pacific Northwest fishermen, in particular, where there are quite large underutilized resources of most ground fish, including a number of species of flounder that are hardly used at all. The fishermen are

kept on quotas by the processors in relation to the amount of product that can be sold in this rather limited flounder market at existing prices.

Nevertheless the market for flounder and the landings of this commodity continues to grow. The value of the catch continued to grow until recently. It will be noted from Tables 2 and 3 that the record volume of landings, and value as well, was in 1965. The volume was a little down in 1966 but the value was up to a new record. The volume in both years was well above the five years (1960-64) average. Flounder is in about seventh place in respect of volume and eighth place in value among U.S. flag fish landings. The long range outlook is for a steady increase in both volume and value, although catch and volume was down again in 1967.

In spite of what would look on the surface to be a reasonably satisfactory condition of growth in both volume and value in the flounder fishery it is from precisely the trawl fisheries that produce flounder as well as other groundfish in New England, Oregon and Washington whence comes the most vigorous and steady political complaints about their sorry lot. It is the trawl fishery which mostly forms the basis for judging that the United States flag fishery is decadent, declining, and composed of overaged, inefficient, obsolete vessels and men. It is this fishery whence comes the vigorous and continuing political whine that the Russians are catching up all their fish and crowding them off their own fishing grounds.

The reason for this anomaly are not hard to find but they are in somewhat different quarters than the complaints illuminate.

Flounders are produced by otter trawls, the same gear (and kind of vessels) that produce cod, hake, haddock, pollack, ocean perch, and most of the other numerous sorts of ground fish. As noted above it is precisely this conglomeration of fish which has come to form the raw material for the most rapidly growing edible fish commodity in the world—the frozen fish block from which is made fish sticks, portions, sandwiches, chips, etc. The drive for building this market, and its technology, originated in the United States. It is in the United States that the market for this sort of fishery product has grown so rapidly in recent years, having come from 256 million pounds in 1948 to 576 million pounds in 1966. In fishermen's terms (round weight at the dock) this increase has been from about 850 million pounds in 1948 to 1,900 million pounds in 1966. The raw material required for this trade in the United States alone exceeded in 1966 even the catch of menhaden for fish meal. In 1967 both market and use were down slightly from 1966 records, but are going up again in 1968.

These otter trawlers, as a group, have not participated in the market growth for this product. Their share of that market was 74% in 1948, 44% in 1957, and 30% in 1967. It is just precisely the sorts of fish that fill this market that they are able to catch on the grounds where they now fish, or where they did fish in the experience of the men still active in the fleet. Their government scientists tell them quite truthfully that there are resources available in coastal waters of the United States and Canada, which they are accustomed to fishing adequate to not only fill this market completely but to provide a substantial surplus for export, and they know this. Their processor customers tell them that if they will produce fish from which good quality fish blocks can be made at competitive prices with imports (say 25¢ per pound) they will buy from them. These otter-trawlers cannot do this profitably so they have had to shrink back to the production of higher value flounders rather than grow into this fabulously growing new market in their own home country. Even flounder resource abundance problems are appearing in New England the last two or three years.

The New England otter trawlers at the end of World War II were the strongest and most vigorously growing branch of the United States flag fishing industry. United States Government policy reduced them deliberately to a position of economic weakness and shrinking in a very few years. It did this by making the United States market freely and purposely open to ground fish from other North Atlantic countries (particularly Canada and Scandinavia) to increase their dollar earning capabilities. The policy was enunciated by the President of the United States who, after the otter-trawlers of New England had exhausted remedies available to them under law and won their case, overruled the U.S. Tariff Commission ruling on the grounds of supervening national interest which existed at that time.

The effect of this has been to shrink the geographic range of the New England ground fisheries back from the entire Northwest Atlantic pretty well to George's Bank off Massachusetts and to inshore waters, to remove the economic possibility

of joining the shrimp, tuna, and king crab fishermen in tooling up with modern new vessels, to limit the possibility of attracting vigorous young men into the fleet, and to restrict their activities pretty well to high-grading the higher priced resources of flounder and scallop which they could reach with the smaller vessels with which they were left, whose rather restricted (if more lucrative) markets the foreign fishermen could not reach quite so easily as could they. The net, and humiliating, effect was to be shrunk back from first place in the Northwest Atlantic fishery to eighth or ninth place, and become the butt of study team after study team from Washington, D.C. who held them to be inefficient, overage and outmoded because policy established in Washington, D.C. had been successful and had knocked their economic feet out from under them.

In the last few years the final ignomy has been added by large, modern fleets of Russian trawlers appearing even on George's Bank and putting sufficient added fishing effort on haddock and silver hake resources so that these have become heavily overfished, which has brought additional economic hardship to the New England trawlers.

To the humiliation and economic distress was added the excessive irritation of losing their markets in the United States primarily to Canadian fishermen who received increasing and lavish vessel construction subsidies and much related sensible and effective support, from both the Canadian Federal and Provincial Governments, to the extent that it has been stated that a new vessel could be built in Nova Scotia with modest investment and generate a cash flow without leaving the dock.

Under this pressure by the Canadian Government to develop its maritime fisheries not only did Canadian production on these grounds grow (and fill the American market) but under various Canadian incentives the most vigorous United States processors and marketers moved their facilities and operations from New England to the Maritime Provinces. Rail transport to the actively growing market of middle United States was better from Canadian than New England ports and substantially the whole of this market was removed from those who remained in New England. Icelandic and Norwegian firms moved into the fish stick and portion manufacturing business in New England, but used frozen fish blocks imported from home, not of New England provenance. While private in nature they were so closely supported by the Icelandic and Norwegian Governments as to appear to the New England ground fishermen to be at least semi-governmental.

This story is not at an end yet. Canadian fishermen in their heavily subsidized vessels have increasingly moved into the scallop beds off George's Bank, which were a chief remaining source of income to the Massachusetts ground fishermen, and into the United States market. As the supply of scallop meats to the U.S. market from Massachusetts fishermen shrunk from its high point of 22 million pounds in 1961 to a low of 11 million pounds in 1966, imports from Canada grew from 9 million pounds to 17 million pounds. Under the increased fishing pressure the stock collapsed and is being heavily overfished. The fishery lies entirely in international waters. The Canadian Government is much more interested in creating economic conditions which will cause European fishermen to retreat from the Northwest Atlantic fisheries than it is in conserving particular stocks of fish or shellfish in that region at the moment. Accordingly a chief remaining support of the Massachusetts ground fishermen is removed through circumstances beyond their control, and for which they have no remedy.

Their remaining support was from inshore flounder and from George's Bank haddock. They retained this chiefly because they have better transport access to the megalopolis from Boston to Washington, D.C., where most of these products are consumed, than do the Canadians, whose access is best to the mid-West markets. The New England ground fishermen see this last vestige of protection disappearing as the Canadian freeway system joins up with the New England extension of the Federal freeway system and gives the Lunenburg, Nova Scotia, processing plants easy truck access to the New York market. The Canadians are already fishing the haddock resource off George's Bank vigorously as are the Russians. Now the three chief groundfish resources (haddock, silver hake, and scallop) still available to New England groundfishermen are substantially overfished.

The New England fishermen therefore look forward to being pushed back even more upon the inshore flounder resources which can be sold fresh and locally, and these are not large enough to permit much, if any, expansion. It is not a pretty prospect and they cannot be expected to like it.

Pacific Northwest otter-trawlers have never been as large in production as those of New England although the groundfish resources available to them are larger than those adjacent to New England. The entire production of trawl fish by American and Canadian fishermen, together, from the Northeast Pacific ranged from 125 to 140 million pounds in the decade 1955-1964. This has increased somewhat in the last few years. The Alaskan trawl catch was a quarter of a million pounds in 1966. British Columbia catches were at a record high in 1965 at 44 million pounds, but have gone up since. The Washington State fleet also had a record high to that time of 53 million pounds in 1965. The Oregon catch is on a smaller scale yet, and provided less than 20 million pounds per year. The California trawl catch amounts to something less than 40 million pounds per year.

The most vociferous otter trawlers politically on the national level have been those of Oregon and Washington who, between them, scarcely produce 75 million pounds of fish per year. A large proportion of what they do produce is sold very cheaply for animal (principally mink) feeding. Their substantial revenues come from their landings of flounder for direct human consumption (much is landed for mink feed also). They are customarily limited by the buyers of five or six species of these out of the twenty-odd available to them. Even for these they are ordinarily put on weekly or other quotas.

Among the most abundant other fish available to them are Pacific perch. There are thirty-odd species of these. They are limited by the buyers to fishing for two or three species of these and are ordinarily under buyer's quota's of a weekly or other nature even for these. The catch of ocean perch in Oregon and Washington in 1965 was 28 million pounds.

All of this contrasts with estimated resources of demersal fishes available in the Northeast Pacific suitable to support sustainable fisheries off California of 600 million pounds per year, off Oregon, Washington and British Columbia, of 800 million pounds per year, in the Gulf of Alaska of 900 million pounds per year, and in Eastern Bering Sea of 3 billion pounds per year. This makes a potential sustainable yield of demersal fishes in the Northeast Pacific of 5.3 billion pounds per year (above the average of all landings by all U.S. flag fishing vessels per year in all fisheries over the last 30 years), as contrasted with the actual yield of less than 200 million pounds per year by all American fishermen from the area, and the somewhat less than 75 million pounds per year for the trawlers of Oregon and Washington.

The complaints of Oregon and Washington trawlers are at several levels, and include these:

1. Their large market for demersal fish is the booming fish block business of the mid-west and eastern seaboard. This is substantially in the hands of Canadian, Icelandic and Norwegian fishermen. They can seldom compete in this market even in the metropolitan areas of Los Angeles, San Francisco Bay area, Portland and Seattle-Tacoma, much less the mid-west or east coast. Historically they could not compete in the latter two areas against New England fishermen because of transportation costs, and they get frozen out of those markets before the New Englanders do.

2. Their flounder and ocean perch production is pretty well limited to the restricted restaurant and home trade of the west coast area and that is not large enough to handle any considerable portion of the resources available to them. Also production from British Columbia trawlers (having the normal Canadian governmental supports that United States fishermen do not get from their government) competes directly with theirs in these western metropolitan markets.

They submit to conservation regulations on two of their most important cash resources (English Sole and Petrale), off the Washington coast arranged through the Pacific States Marine Fisheries Commission. Canada is not a member of the latter and while it coordinates its regulations fairly well, the Washington fishermen are not exactly sure that the Canadian fishermen fishing along side them are submitting to the same regulations they are.

4. The Canadian fishermen are pressing their Government to declare Hecate Straits, Queen Charlotte Sound, and intervening waters which provide State of Washington trawlers some of their best fishing, as internal waters of Canada, which would eliminate those grounds from their fishing area. The Canadians say that the Americans will be given their historic rights to fish in those waters still, but being given rights, and having them naturally, are two different things.

5. They cannot land halibut, which is the most valuable ground fish (and flounder) in the region, because of regulations of the International Pacific Halibut

Fisheries Commission which do not permit the catching of any except incidental halibut by otter-trawl.

6. A very large Russian fleet of large trawlers moved into the coastal area where the Americans fished off Oregon and Washington in 1966 and in the first year of almost experimental fishing caught about 300 million pounds of fish against their 75 or so million. Adding insult to injury the press and the public immediately assumed the Oregon and Washington trawlers to be hopelessly incompetent, inefficient and backward because they did not have large vessels like the Russians. The truth was, as noted further below, they could not afford to have operated as large a trawler as the smallest Russian vessel in their fishery if it were given to them, and in catch per man hour, ship-ton, or other measures they were far more efficient than the Russians. They just did not have market for what they could catch, or much support and comfort from their own government.

Quite aside from the general uproar they cause politically these otter trawlers of the Pacific Northwest and New England are the vociferous exponents of declaring the fishery limits of the United States to be co-extensive with the continental shelf, or 200 miles broad whichever is greater. This would not necessarily have any beneficial effect on their market or economics, but it would get the Canadian, European, and Asiatic fishermen out of their remaining accustomed fishing grounds, and out of sight. This would be satisfaction enough for most U.S. flag otter-trawlers. The impact of this on the military posture of the United States (as noted below) could be considerable, and adverse.

It is obviously confusing to try and discuss in one brief space and at the same time, the general problems of the New England and Pacific Northwest trawl fishermen; flounder, ocean perch, cod, haddock, scallop, and hake resource problems; import policies of the United States; foreign aid policies; subsidies in other countries; the flow of ground fish into several parts of the United States fish market.

The trouble is that all of these things are inter-tied with the trawl fisheries and cannot be separated out and dealt with in neat units.

The statistics of the flounder fisheries, which reflect generally increased landings and values, also partially hide the most painful running sores of the United States flag fishing industry because flounder are caught by the ground fish fisheries which are the worst off of the United States flag fisheries generally. A ray of hope is the presently booming shrimp and scallop fishery of the Gulf of Alaska which may give strength to the trawl fishery in that region needed to spark production from other very large ground fish resources available in the region and fishes substantially now only by Russian and Japanese trawlers.

(15) *Discarded fish.*—The most productive fishery of the United States, well larger than menhaden, is for fish that are discarded at sea and never brought to port. It is reckoned that these discarded amount to at least 1,300 million pounds in the Gulf of Mexico shrimp fishery alone. A substantial amount arises from most of the trawl fisheries elsewhere around the rim of the country. Nearly all of this fish dies when returned to the sea. Intensive effort is required to turn this major waste into economic use.

(16) *General Comments Arising from a Consideration of Specific Fisheries.*—In the above discussion brief attention is paid to fifteen of the principal fisheries composing a substantial part of the value and volume of U.S. flag landings. The purpose has been not to be comprehensive but to illustrate that the statistical stagnancy of the U.S. fisheries over the past thirty years is statistical and not real. A blanket statistical approach to this subject merely cloaks from view a great variety of dynamic situations, most of them having quite different origins, and a large number of complex problems requiring, for the most part, slightly or quite different solutions.

If nine of these resources (Pacific sardine, menhaden, Pacific salmon, cod, haddock, Atlantic perch, jack mackerel, Pacific mackerel and oysters) were produced at the peak point that they ever reached (a thing not possible on a sustainable level) the annual catch from these alone would be 5,892 million pounds (or greater than the annual average catch for all U.S. fisheries over the past 30 years). In matter of fact these nine resources produced less than half that amount in 1967. Between these two levels proper management of the use of the resources could at least have kept them producing at a much higher level than they do today.

Furthermore there is no pattern to the time at which the peak in these major crops were taken. Cod and oyster production were at their recorded peak of U.S. production in 1880 when the first U.S. fishery census was taken. Pacific

mackerel reached its peak in 1935 and Pacific sardine in 1936, as did Pacific salmon. There may be some relation between the peaking of the two predominantly southern California fisheries (although nobody has attempted to demonstrate one), but there would not appear to be any climatic, economic, or other relation between the drop off in those two fisheries and the one for Pacific salmon. It may be noted, however, that the drop off in production from these three resources which produced 2 billion pounds more in 1936 than they did in 1967 amounted to better than 40 percent of what was produced in 1936, but that this drop off had been just about evened out by production from other resources by 1967.

The peak of production in haddock was in 1929, but this was related to a series of good incoming year classes and a strong market for scrod, not to the market crash of 1929. The high point in Atlantic perch production was reached in 1951, and of jack mackerel in 1952, but in each case the drop off since was related to factors not at all common to the two, or the general fish market. The high point in menhaden production was 1962, but the drop off since then is not related to market, which has grown sharply since then, but to lack of fish, which is almost certainly a factor of overfishing, although variations in environmental factors may be operating too.

The declines in Pacific sardine, menhaden, and Pacific mackerel which has been, in toto, about 2,250 million pounds (or most of that total) seem to be quite clearly attributable mostly to overfishing. In sardine and mackerel the course is run and the fisheries are done; in the case of menhaden the decline has just nicely started. It has continued since 1965 when the catch was 1,726 million pounds. In 1967 it was 1,170 million pounds (about half its peak of 1962). Nothing has been learned. The State of California still has no effective machinery with which to bring modern management methods to bear on its ocean resource affairs and neither do the Atlantic coast or Gulf States. The Federal Government still accepts no responsibility in such matters. It has no machinery to deal with them if it did. Because of touchy Federal-State relations the Federal Government is even reluctant to mention these matters publicly, although in both areas it is the one that has had the research information from which overfishing and decline could be detected, and it has the jurisdiction, if it would only assert it, over the ocean area from which most fish and shellfish production comes.

The decline in oyster production results from a combination of almost all of the mismanagement methods so far devised by the United States for its natural resources—overfishing, pollution (both domestic and industrial), silting of estuaries through poor land management, economic regulations of the fishery aimed at decreasing its efficiency (sail boats and rakes on parts of Chesapeake Bay), interstate fighting over common resources (Maryland and Virginia in the Potomac), lack of economic incentive to farm (no tide land tenure rules in most states), etc. It is about as sorry a picture as the passenger pigeon, buffalo, and whooping crane, with no relief in sight on either a State or Federal level.

The drop off in cod, Atlantic perch and haddock are not related to market condition, because the use of these three in the United States has continued directly upward. In the case of haddock and perch some overfishing is probably represented, and in haddock this is presently serious. In cod there is no such effect. The major drop-off in the three is attributable to conscious action by the United States Government in letting the New England ground fish fishery decay since 1948, and in not providing conservation management to haddock and perch resources lying in the high seas, a matter fully within its competence under the 1958 "Convention on Fishing and the Conservation of the Living Resources of the High Seas".

It is not certain that the drop off in Pacific salmon since 1936 is much attributable to any particular thing that one can put a finger on. All five resources are being used fully. Perhaps one or more is being used too fully but not because of lack of regulatory intent or machinery. Furthermore the present low level is not necessarily a permanent feature. Market is strong and economic incentive could be improved quickly by repeal of a few of the more stupid state laws.

The drop-off in jack mackerel landings is not related to resource strength, or to imports, or to bad management. The economic causes of this drop-off appear to be related to the decay of the sardine and Pacific mackerel fishery around it which has not left a fleet strong enough to subsist on jack mackerel alone at prices which will fit the product into any available market.

CHAPTER IV.—THE NATURE OF LIVING MARINE RESOURCES, JURISDICTION OVER THEM,
AND CONCEPTS FOR MANAGING THEIR USE

A. The nature of living resources

The basic factor in dealing with living resources, as differentiated from non-living, is that they are continuously renewing themselves. They do this in relation to general laws of nature, and in accordance with special conditions that are not only specific to each individual species, but frequently differ among the races or homogeneous stocks within a species.

In general a male and female from one generation will produce at such a rate that in a state of natural equilibrium the result will be just exactly one male and one female in the following generation. Different sorts of resources react to the vicissitudes of their environment by providing different reproductive surplus' to counter the different mortality rates the stock has encountered historically. For instance, fur seals produce one pup (more rarely two) per year after the adult stage is reached, and such a slow rate of reproduction is typical among elasmobranchs (sharks, skates and rays). For instance the dog fish shark will produce six or eight young every two years. In the fin fishes the reproductive rate is highly diverse but generally more liberal. The viviparous perch will produce a few dozen young per year; the salmon, trout, herrings, anchovies, etc., will produce a few thousand young per year; the ocean perch will produce a few tens of thousands of young per year; and so on up to the tunas, cods, etc., that will produce a few million young per year. This range, roughly speaking, is characteristic also of the wide range of invertebrate resources normally called shellfish.

But the general rule holds. Nature anticipated expected mortality rates for the stock by producing sufficient young so that in a state of balance two animals beget two in one generation, and no more or less.

Man may (and does) intervene in this process in various ways. This can be done to his benefit or harm. Whether the intervention will be harmful or beneficial depends absolutely upon knowledge of the species of animal, the principal characteristics of its specific life history, the rates of natural mortality, the rate of growth of the individuals in the stock, the rate of recruitment (reproduction), the effect of addition of artificial (fishing) mortality on the stock, and the effect of variations in the environment on these factors.

There are no short cuts. A great deal of expensive and time consuming research of a high order of sophistication must be done to have the ingredients for knowing how to manage the use of a resource to any effect, either beneficial or harmful. Research done on such a population dynamic problem for one species of animal is of very little use in dealing with another species of animal, because its vital processes will be different. This is frequently the case for separate homogeneous populations within a particular species.

Generally speaking, when animals are removed from the population by fishing or gathering the total number of animals in the population decreases, the average size (age) of individuals in the population decreases, the catch per unit of effort decreases, and the reproduction efficiency of the population as a whole increases (so that two can still beget two under these additional stresses and the population still survive).

As the rate of fishing pressure (mortality) increases the amount of the catch increases, while the abundance (numbers) and weight of the remaining population decreases. This condition continues to exist up to a certain point where the added rate of artificial mortality (fishing) plus the natural mortality inherent in the stock and its relations to its environment, begins to exceed the total possible reproductive capability of the population. This is called the point of maximum sustainable yield (MSY), a phrase often encountered in dealing with fishery management.

Beyond this point of MSY, if fishing effort is still increased, the catch will either level off (under conditions where there is enough reproductive surplus escaping the fishery to provide all the young the environment will support) or drop more or less sharply (depending upon the dependence the reproductive rate of the population has on the number of reproducing adults left by the fishery in the population). Under the latter condition that total rate of mortality can get so high in relation to reproductive capabilities that it, possibly aided by adverse environmental conditions, can extinguish the stock and species (the case of the passenger pigeon and the saber-toothed tiger), or drive it below the threshold of commercial importance (the case of the Pacific sardine). Under either situa-

tion the catch per unit of effort goes steadily (and perhaps sharply) down, and the cost per unit of production goes up.

This concept of maximum sustainable yield is basic to fishery management but it has a great many pitfalls. Variations in the environment (and these may be in the biological as well as the physical environment) may cause wide swings in the level of maximum sustainable yield available from a particular population through changes in survival rate attributable to natural conditions. These changes may come in succeeding years or move in more or less a cyclic manner. The point of maximum sustainable yield is always difficult to estimate with the best of scientific data and understanding, and must often be a well educated guess based on the best data and understanding available.

In the case of animals of temperate regions (where most fishery population dynamics research has been done) a rough rule of thumb is talked about by fishery scientists, but not very strongly relied upon because of continued uncertainty and doubt. That is to the effect that the point of maximum sustainable yield is reached about where the stock is half as abundant as it was in the state of nature, and that at this point of lowered abundance about half of the remaining population can be removed by the fishery each year without causing gross further perturbations in population levels.

The above very generalized suggestions applies to temperate stocks where a number of year classes are available at any one time to the fishery. Some resources supporting major fisheries are, however, almost annual crops, and this condition is more common in the tropics where life cycles tend to move more swiftly than under boreal or arctic conditions. For instance, most of the *Penaeid* shrimps that support most present shrimp production in the world live only fifteen to eighteen months in a state of nature. The anchovy that support the mammoth fishery of Peru live only two or three years in a state of nature. The tropical tunas (yellowfin and skipjack) at least come to maturity and adult size in two or three years, etc. In the case of the shrimp (and probably many other tropical resources) if the crop is not taken in the year it dies, like the field of wheat, and is not available for harvest the next year.

The great variety in the nature of success or failure among the various commercial fisheries of the United States has been noted. There is just as great variety in the natural capability of particular resources to support fisheries. Some (most mammals and sharks) will support only a very light relative fishing mortality without the population going downhill until it is eliminated as a commercial proposition, or is eradicated entirely. Others (such as tuna, cod, ocean perch, anchovy) have such enormous natural reproductive resilience that ordinarily the population gets below the level of commercial practicability in harvest before the stock is in much danger. The fishery goes broke before the population does. In other cases (salmon, fur seal, oysters, clams, *Penaeid* shrimp) a characteristic of the life history of the species may make it particularly liable to being damaged by man's activities. All salmon, for instance, must come into fresh water to reproduce (pink salmon may be a partial exception under particular circumstances) and if access to their fresh water range is cut off by obstructions the population is killed off entirely.

The specificity may be more detailed. Most races of sockeye salmon must spawn in relation to a lake so that their young can spend a year or so in the lacustrine habitat, or the race dies. Fur seal require a hauling out ground that is cool for reproductive activity which means in practice, fog enshrouded. These locations are few in the world. The young of most commercial *Penaeid* shrimp must have a brackish water habitat for a few months or they will not survive in good number. The number of such criteria of living resources are legion, and must be learned about (and heeded) to provide the basis for management of the use of the resource.

B. Jurisdiction over fisheries

Man may (and does) intervene in these complicated natural situations of living resources in order to make the particular resource produce what he wants in the manner he wants it. To do this in a conscious, regular, and continuous manner some entity must have jurisdiction over the resource and its use, whether this is called ownership, sovereignty or just jurisdiction. This situation is just as complex in fisheries as the natural conditions of the resources and the variability in economic success of their commercial harvesting.

Under international law there are four sorts of waters juridically, from the standpoint of fisheries.

Internal waters are those within a nation over which it has the same total sovereignty, and rights of exclusive use, as it has over its land territory.

The territorial sea is that body of water between the outer boundary of internal waters and the inner boundary of the high seas. The breadth of this band of water is not agreed upon by nations, but there is general agreement that it is not more than 12 marine miles (the United States claims three). Within this band the contiguous nation has full jurisdiction over the use of resources, and exclusive right to their exploration and use. Sovereignty is total for most purposes except the right of innocent passage by foreign vessels through the territorial sea.

The contiguous zone is measured 12 marine miles out from the outer boundary of internal waters. In it the contiguous coastal nation has jurisdiction for purposes of protecting its internal security, customs, health, etc. There is a growing tendency (to which the United States has recently adhered) for the coastal state to claim (and have the claim honored by others) rights of exclusive jurisdiction and use over the living resources in this 12 mile zone. Thus the United States claims exclusive jurisdiction and use over the living resources within both its territorial sea (3 marine miles broad outward of internal waters) and its contiguous zone (another 9 marine miles seaward of the territorial sea).

Outside the contiguous zone is the high seas. Among other freedoms of the high seas generally agreed to is freedom of fishing. The result is that high seas living resources (with the exception of those which at their harvestable stage are in constant physical contact with the continental shelf) are the common property of all people. Put another way, they are the property of him who first reduces them to his possession.

It should not be taken that the individual fisherman or fishing vessel has any individual right to fish on the high seas. Fishermen and vessels are frequently the objects of international law, but only sovereign nation states are its subjects. The fisherman and his vessel works on the high seas (or traverses the contiguous zone and territorial sea of another nation in innocent passage) only under rights that pertain to his sovereign, and not to him. His vessel while on the sea is a part of the territory of the nation whose flag it wears for juridical purposes. It is responsible to the international community for his acts on the high seas.

The management of the use of specific (or total) resources of the high seas, when that is arranged for at all, is arranged among the affected sovereigns in accordance with agreements, treaties and conventions made among them. These are rather numerous, highly varied as to nature, and can be of short or indefinite duration. The United States for instance, is a party to nine international fishery conventions (of which eight are presently operative) having specific responsibilities among the signatory nations for the conservation management of a particular high seas fishery resources, or of the fisheries in a specific region of the high seas. It also has a number of bilateral agreements with nations where fishermen fish in, or near, its contiguous zone.

The United States is also a party to the general "Convention on Fishing and the Conservation of the Living Resources of the High Seas" whose provisions are in effect with respect to the nations which have adhered to it. These are 25 out of the 138 sovereign nation states, and many of them are not very important fishing countries.

International law also contains concepts on the jurisdiction over fishing in the high seas growing out of the practice of nations and treaty law. These are of modest effectiveness at the present stage of history because of the lack of any international enforcement agency beyond public opinion, or of a court of resort before which the sovereign nations can be hailed without their consent.

Within the United States jurisdiction over the fisheries is left to the State Governments, with certain prominent exceptions. Where the United States is a party to an international conservation convention the Federal Government has jurisdiction over United States interest in the fisheries covered by the convention and these regulatory authorities are lodged in the Bureau of Commercial Fisheries, Department of the Interior. In enacting the legislation establishing the Fishery Contiguous Zone the Congress deliberately left undisturbed for further decision the question of whether State or Federal jurisdiction applied in fisheries in the contiguous zone outside the limits of the territorial sea. There is no question but what the Federal Government has jurisdiction over fishing vessels flying its flag on the high seas, but in general this right has not been asserted or acted upon. In practice the States have exerted jurisdiction, and still do, over their own fishermen fishing in the high seas where they wished to do so, and by

means they felt to be appropriate. In California, for instance, fishermen can land in the State of California only those fish taken in accordance with California State regulations, wherever they are caught.

Although these jurisdictional situations are all somewhat in dispute they do provide the juridical framework within which fisheries are conducted. Both the fish and the fishermen make practical jurisdiction over fisheries for conservation management purposes complex and difficult because of their migratory, and other, habits.

Many of the most important marine resources make longer or shorter migrations during their life which are of vital importance to them. Prevented from doing so they die or do not thrive.

Diadromous fish like salmon, sea-run trouts, some smelts, alewives, river herring, freshwater eel, shad, some sturgeons, etc., regularly and necessarily pass through all of these four juridical zones regularly in the course of their life history. If they are prevented from doing so they die. Consider, for instance, the Columbia river chinook salmon spawned in the Salmon river of Idaho. During its life it passes twice through the jurisdictional waters of Idaho, Oregon, Washington and the United States 12 mile contiguous zone. It is subject to being fished on in the high seas off Oregon (occasionally California), Washington, British Columbia, and Alaska. Only treaty undertakings between Japan, Canada and the United States prevent it being fished upon by Japanese fishermen as well, and if it migrates west of 175° E. longitude those prohibitions vanish.

Tunas migrate across oceans. Bluefin tuna tagged off Baja California have been recaptured in the Sea of Japan; skipjack tuna similarly tagged have been recaptured southeast of Hawaii; albacore similarly tagged have been recaptured north of Hawaii and off Japan; bluefin tuna tagged in the Bahamas have been caught in the North Sea and the Bay of Biscay.

Fur seals from the Pribilof Island herd migrate down along the coast of Japan and along the coast of North America to Baja California. Whales migrate over hemispheres.

Even with the large coastal populations of fish that support major fisheries and are reasonably stable as to migrations, migrations during the natural spawning, feeding and growing cycles are sufficiently extensive that it is not possible to settle major jurisdictional problems or attend to the conservation management of many major resources within one area of political jurisdiction. Most resources supporting major fisheries on a world-wide basis either occur solely or mostly in the high seas outside even a 12-mile contiguous zone, or move out of the territorial sea to there at some stage of their life history, and become available for capture on the high seas.

By far the bulk of living resources now utilized or known about live on the continental shelf or reasonably close to shore. Prominent exceptions like tuna, salmon, whales, cod, ocean perch, etc., can be caught well offshore in many areas of the world ocean, but the general statement still holds true. Although these coastal large resources tend to migrate along coasts, there are major resources that stay pretty well within 50 to 100 miles of land, and, in countries like the United States, Norway, Chile, Argentina, India, China, Canada, Peru, and others with long coast lines, a good many large resources could be pretty well managed by a single country if its jurisdiction were broader. Some countries like Chile, Ecuador, Peru, and Argentina in this category have attempted to establish 200 miles zones of fishery jurisdiction to accomplish this purpose, and they have been followed by smaller countries like Panama and El Salvador.

This has not been accepted generally by the nations as legitimate international practice. A principal reason for this is that with improved technology the fishermen have become even more migratory than the fish. Japanese and Russian fishermen already fish customarily almost all of the world ocean. Where they can secure bases near particular fishing grounds at reasonable cost they fish out of them. When they cannot they fish out of home bases supported by motherships, carrier vessels, fueling vessels, hospital ships, etc.

Fishermen of South Korea and Taiwan are not far behind those of Japan and Russia in the geographic scope of their distant water fisheries. Norway, Germany, Denmark, Faroe Islands, East Germany, Poland, Roumania, Netherlands, Bulgaria, Greece, Israel, United Arab Republic, Yugoslavia, Italy, Spain, Portugal, Kuwait, France, United Kingdom, Iceland, Ghana, United States, Cuba, Venezuela, and Canada possess distant water fisheries of importance to them, and such are developing in Mexico, Ecuador, Senegal, Thailand, Ceylon, and West Pakistan. As other nations develop their fishing strength the same long range fishing ten-

dencies will develop, and the development programs of the United Nations Development Program and World Bank, executed by FAO Department of Fisheries, are rather rapidly becoming effective in many parts of the world.

Thus there arises the classic dichotomy between the distant water and the coastal fishermen which is such a factor in fishery jurisdiction problems on a world wide base, not only among nations, but among groups of fishermen within a nation. In these days of rapid application of science and technology to fishery development the political basis of this dichotomy has a disturbing habit of shifting while the problem is in process of solution. Some examples will illustrate.

When the Truman Proclamation was issued in 1945 the only fishery people in the United States who were interested in it were the salmon and halibut people of the Pacific Northwest who hoped to use it to keep Japanese, particularly, but also Russian fishermen out of the Northeast Pacific. When they learned of this possible effect the tuna people of California, the shrimp people of the Gulf of Mexico, and the New England trawl people were opposed to it because the California tuna fishermen made almost all of their catches off Latin America, the shrimp fishermen were expanding rapidly into the offshore waters of Mexico in the Gulf of Mexico, and the New Englanders were still expanding their trawl fisheries of the Maritime Provinces of Canada and Newfoundland. The other fisheries people around the rim of the country had little interest in the problem because they worked close to the coast, there were no foreign vessels fishing where they did, and they expected no such competition to arise. It was out of the salmon-halibut, tuna-shrimp—New England trawl interaction that the Office of the Special Advisor to the Secretary for Fish and Wildlife arose in the Department of State.

By the time of the 1958 conference on the Law of the Sea the New England trawl fishery position had eroded to the point where they did not fish on the Grand Banks any more, did not fish on the Nova Scotia banks, had pretty well forgotten about Labrador and the Gulf of St. Lawrence, and were mostly fishing by themselves on Georges Bank off New England, so they were reasonably neutral on the subject and politically weakened in the United States. The shrimp people had reached a moderately good *modus vivendi* with the Mexicans in the Gulf of Mexico, on the basis of the Mexican 9-mile territorial sea, and only the California tuna people were left in sharp opposition to the salmon and halibut.

Now, a decade later, if a vote were taken in the United States fishing industry it would be heavily in favor of a 200 mile fishery limit for the United States. The whole Atlantic seaboard would be in favor of it because the New Englanders no longer fish substantially off Canada and want the Canadians and Russians who fish on Georges Bank and further south along the Atlantic coast to be thrown out of those fisheries. The menhaden fishermen fear Russian fishing on the Central Atlantic Seaboard. The southern people fear Cuban's, Russians and Japanese fishing from the Carolinas to Key West. On the Pacific coast the situation is much the same as far down as southern California because Russians fish in the coastal waters of this whole region, and the Japanese fish south to Oregon. The salmon and halibut people have been joined and strengthened by the crab fishermen and trawlers along the whole coast. The Gulf shrimp people really have no problem since the United States and Mexico have agreed on a 12 mile fishery zone. The California tuna fishermen alone in United States fisheries are in strong favor of a narrow fishery jurisdiction zone, bringing to their side Puerto Rico which has become importantly involved as a tuna canner in the interim, and the State of Washington that has become importantly involved in building new tuna clippers for both these places. The pendulum may be beginning to swing back again in the Gulf States as the new longer-range freezing vessels are entering the shrimp fleet. It may even be beginning to swing back again in New England because the few new trawlers that have been built under the Vessel subsidy act are doing quite well financially.

The situation found in the United States is found in some degree in other countries where coastal fishermen with small, often antiquated, vessels and techniques wish to do away with the competition from the distant water fishermen, ordinarily equipped with larger and more modern vessels. Thus Canadian long-liners for a long while were able to keep Canadian trawlers 12 miles off the Nova Scotia coast: the Japanese coastal fishermen fight to keep the Russians out of the saury and squid fishery, and the South Koreans out of the salmon fishery off Japan; the Finmark cod fishermen fight to keep Norwegian trawlers out of the Lofoten and other inshore cod grounds; the coastal fishermen of West India prevent the modernization of the offshore sardine and mackerel fisheries, the yield of which

India so badly needs; the coastal fishermen of Malaysia have fought bitterly the building of a Malaysian trawl fishery; etc. The old and inefficient fights steadily around the world against the new and efficient.

On the international scene another sort of shift has been taking place on a national, instead of a fishermen level. At the time of the 1958 Law of the Sea Conference the fisheries jurisdiction issue was rather clear cut between the industrialized countries who were the strong fishing countries, and the developing countries who were the coastal fishermen traditional inshore type disliking distant water fishermen. In the ensuing decade this particular dichotomy had become less clear because of the number of developing countries which with various kinds of assistance and drives are becoming rather strong fishing countries (such as Ghana, Cuba, Chile, Roumania, Senegal, Poland, Thailand, Kuwait, South Korea, Taiwan) with increasing distant water fleets, while a good many of the industrialized "fishing" countries of 1958 (United Kingdom, West Germany, France, United States, Canada) really have not been improving their fishery posture much.

Another force of a national nature bearing on these jurisdictional questions is the national purposes for which nation states protect and seek to extend their sea fisheries. A decade ago these discussions were put in the framework of preventing the fishing countries from killing off the resources of the sea and depriving developing countries of food resources they would need in the future. In general this type of argument has now been subordinated to another—the desire of nations to protect their foreign exchange balance by harvesting the commonly owned resources of the high seas. It is conceived that this can be done by catching fish and shellfish by their own vessels and fishermen within their own currency area so as to avoid paying out currency to buy animal protein for the nation's nourishment, or to earn foreign currency by exporting catches so made to hard currency countries. This would appear to be a dominant drive among nation states currently in fishery development, and it leads often to non-economic practices of subsidies, control of international trade, and interaction over fishery jurisdictional problems on the high seas that are complex and confusing.

Although the jurisdictional framework for the management of the use of the living resources of the sea is as stated above, it is a fragile structure. There are strong forces on the one hand who desire, for a variety of reasons, to fully internationalize all high seas resources and turn their control and management over to a United States agency; there are strong forces on the other side equally pressing for an extension outward of the seaward boundaries of national jurisdiction so that the ocean becomes, for this purpose, a series of national lakes.

From the standpoint of United States policy with respect to its fisheries it is desirable to look a little more closely at current concepts of management for the use of common property wild fish stocks in the high seas and domestic concepts of the use of common property fishing resources in the United States.

C. Concepts of management for the use of common property wild fish stocks in the high seas

Having in mind the natural and juridical factors noted above the questions arise:

(1) What should be maximized in the management of common property marine living resources: and

(2) What will the sovereign joint owners agree to maximize.

The two questions are important because maximizing the physical yield (maximum sustainable yield) from any resource can be demonstrated to be possible at a different population level at which the maximum net economic yield can be made. It can also be demonstrated that the two objectives are mutually exclusive (although the population levels corresponding to both may be within the probable error range of each other because of the sizeable probable error usually attaching to both parameters). Also it can usually be demonstrated that at the population level corresponding to maximum sustainable physical yield from any particular resource the net economic yield is at, or near, zero, and that the population level corresponding to maximum net economic yield is always at least a little higher than that corresponding to the maximum sustainable physical yield.

Arguments surrounding the choice between these two conservation objectives have gone forward in the fishery science profession for forty years, and have been propounded vigorously by professional economists, especially during the past fifteen years. It is not very hard to demonstrate that when fishing pressure on a particular resource nears the point of maximum sustainable yield the sensible thing to do is limit it to that level corresponding to the maximum net

economic yield. By doing so it has been clearly demonstrated that in major mature fisheries, millions, and tens of millions, of dollars could be saved per year. As an example it is generally agreed by the scientists of all countries involved in the very large and valuable Barents Sea cod fishery that if the fishing effort were cut in half the physical yield would increase by perhaps 10%, with a net earning increase to remaining fishermen per year of some tens of millions of dollars.

The trouble is that the social, economic, political and diplomatic consequences that flow from taking such a decision are so complex and vexing that individual nations seldom, if ever, take such a decision in managing common property fisheries within their exclusive jurisdiction and no general formula has been found which permits such a decision to be agreed upon among nations that jointly operate on a particular fishery resource. The grounds for such a general formula is being sought by groups of scientists and economists working together especially in the framework of the Northeast Atlantic Fishery Commission, the International Northwest Atlantic Fisheries Commission, with the cooperation of FAO Department of Fisheries.

At the heart of this problem is the fact that sovereign nations manage the use of their common property fishery resources, when they pay any attention to the problem at all, in such a manner as to maximize the net social return to it from such use, and not the net economic return. The objective may be to maximize physical yield from its fisheries, or employment of its citizens, or foreign exchange earnings, or foreign exchange savings, or the accumulation of capital, or the contribution to defense, or the accomplishment of technical assistance, or to improve the nutritional quality of the national diet, or to support the national posture generally, or some mix of these objectives. Examples can be provided for all of these situations and mixes including most of them.

Nations not only do not attempt to maximize the net economic yield from their use of the common property resource of the ocean but they normally move to the contrary in a most flagrant manner by giving subsidies to their fisheries to increase effort on common property resources, even those known to be beyond the level of fishing effort corresponding to maximum sustainable yield. Numerous examples of this can be cited. Since it is the sovereign nation states who are the joint owners of the living resources of the high seas it is not possible to move on such policy decision until they are in agreement to it.

The diplomatic consequences of such a decision are almost as difficult, and arise from the same source. If one is going to maximize the net economic yield from the use of a fishery resource one must limit entry to the fishery. To do this one must have jurisdiction over all fishermen wishing to participate in the fishery, ability to enforce exclusion, and a court of law in which to prosecute violators. The international mechanics does not exist to do this. The only available mechanism upon which to build such a structure is the United Nations or one of its specialized agencies. The prospective violators (sovereign nation states) make up their membership, and will not delegate their sovereign authority to such a body at this stage of history, or finance its operations.

What the nations have done as a group is adopt the objective of maximizing the sustainable physical yield from common property fishery resources, with a polite, but ineffective, bow in the general direction of maximizing net economic yield.

The first two articles of the "Convention on Fishing and Conservation of the Living Resources of the High Seas" read as follows :

"ARTICLE I

"1. All States have the right for their nationals to engage in fishing on the high seas, subject (a) to their treaty obligations, (b) to the interests and rights of coastal States as provided for in this Convention, and (c) to the provisions contained in the following articles concerning conservation of the living resources of the high seas.

"2. All States have the duty to adopt, or to cooperate with other States in adopting, such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas.

"ARTICLE II

"As employed in this Convention, the expression "conservation of the living resources of the high seas" means the aggregate of the measures rendering pos-

sible the optimum sustainable yield from those resources so as to secure a maximum supply of food and other marine products. Conservation programmes should be formulated with a view to securing in the first place a supply of food for human consumption".

The word optimum in Article 2 is the oblique bow in the direction of maximizing net economic yield. While it is not yet possible to get nations to work jointly even closely in the direction of maximizing net economic yield from the use of common property living resources, these same economic problems also lie at the root of the difficulty of getting them to follow in practice the high resolve of paragraph 2 in Article 1 (cited above), by the criteria agreed to in Article 2. Progress in this is far slower than the rate of development of fishing effort in the high seas.

A sensible compromise would be to divide up the quota that is the result of maximizing the sustainable yield when the resource and fishery on it come to that balance among the nations on the basis of proportions then existing, with a portion set aside for new entrants and annual adjustments among the participants. Then each participating sovereign could maximize his net economic return from his part of the quota in any manner most suitable to his socio-economic needs and desires. There is no indication that such a formulation, or any other, is being seriously considered by the sovereign owners of the common property living resources of the sea, who seem to prefer a *laissez-faire* approach to the problem.

D. Domestic concepts of the use of common property fishery resources in the United States.

The United States has an enviable reputation for promoting the conservation of common property fishery resources in the international common of the high seas stemming from sixty years and more of practice. It is bound by the concepts noted in the section above in its actions, in the international field as adherent to the conventions in which they occur. It has, however, additional concepts to give attention to in the management of the use of marine living resources within its sole jurisdiction. These grow out of demands related to multiple use of the same resource, or related resources, by different sectors of United States society. The above noted concepts are not disagreed to by any of these internal sectors but they do not go far enough to suit some.

Recreation is a principal other user of marine living resources in the United States aside from commercial fishing. In the United States the economic interests involved in the recreational use of the near coast resources is not less than the commercial interest, and the social interest is enormous. Furthermore it grows as the population grows and becomes more congested in metropolitan aggregations along the coast. The "party boat" industry that caters to taking sport fishermen to sea for fishing is a large business in itself.

Associated with the recreational users often, but of quite a different nature, are the conservationists and nature lovers who do not necessarily wish to catch fish or dig clams, or use any of these resources in an extractive manner. They are interested in knowing that the natural habitat in which they live is being preserved as intact as possible without extractive use, or if the latter is necessary that the extraction be done wisely in the interests of preserving the ecological balance of nature as well as possible. Among these are those who just like to watch nature and to them seals, sea-lions, sea-otters, porpoise, whales and the like have an especial attraction. Providing services for whale watching in season in southern California, for instance, is a considerable economic enterprise, and a drawing card for the lucrative tourist trade.

Also there are the educational users who wish to have segments of coastal flora and fauna preserved as nearly intact as possible in natural reserves under their jurisdiction to be used for teaching, research and other educational purposes. In case this is not thought to be a problem it can be noted that the California State Lands Commission, which has jurisdiction over the use of tidelands in that state, has before it more formal application from such educational institutions for such natural preserves in southern California than there is coastline from Point Conception to the Mexican border. The requests overlap and in some instances nearly duplicate.

Most of these non-commercial users of these resources would prefer that they not be used commercially at all, and some sportsman's groups wish actively to do away completely with all commercial fishing. The destruction of the Pacific sardine population, the decimation of the Pacific mackerel population, and the oncoming decline of the menhaden are cited as examples of destruction of resources by un-principled commercial interests.

Some wiser heads in all these various user groups realize the desirability of the states and the national government getting the maximum social benefit out of the use of these natural resources that are the common property of all, and there is much sincere work devoted to finding a formula for this that may draw agreement from all or most of these multiple users, and be in the total public interest.

One such formula has been developed in California. It originated with a group of professional conservationists acting as consultants to the California Department of Fish and Game in its planning for the wise use of all such resources in California, both marine and upland. It was adapted to the marine situation by a group of experts from the University of California acting under the administration of its Institute of Marine Resources for the California State Office of Planning. It was slightly modified and adopted by the California Governor's Advisory Commission on Ocean Resources. In this form it has been agreed to by the major elements in the California commercial fisheries and by a number of conservation leaders in the State. The formula has now been approved in the following form unanimously by the California Advisory Commission on Marine and Coastal Resources and recommended by it to the Governor (through the Interagency Council on Marine Resources) and the Legislature. The formula might be useful on a national level and is as follows (written in California State terms) :

"The Commission recommends that the State Government through cooperation between its executive and legislative branches, should establish policy concerning the conservation and utilization of the living resources of the sea under its jurisdiction and influence, which will encourage their maintenance and full utilization for the benefit of all of our citizens, which will promote the development of local fisheries and of distant water and overseas fisheries based on California, and which will be in harmony with the international law respecting fishing and conservation of the living resources of the high seas. This policy should include the following objectives :

(a) To maintain sufficient populations of all species of marine organisms to insure their continued existence.

(b) To recognize as important the aesthetic, educational, scientific and nonextractive recreational uses of the living resources of the California Current.

(c) Where a species is the object of sport fishing, to encourage the maintenance of sufficient resource to support a reasonable sport use, taking into consideration the necessity of regulating individual sport fishery bag limits to the quantity that is sufficient to provide satisfying sport.

(d) To encourage the growth of local commercial fisheries, consistent with aesthetic, educational, scientific and recreational uses, to foster the utilization of un-used resources, taking into consideration the necessity of regulating the catch within the limits of maximum sustainable yield, and to encourage the development of distant water and overseas fishery enterprises.

(e) To manage, on a basis of adequate scientific information promptly promulgated for public scrutiny, the fisheries under the State's jurisdiction and to participate in the management of other fisheries in which California fishermen are engaged, with the objective of maximizing the sustained harvest and decreasing costs of commercial production".

CHAPTER V.—THE ORGANIZATION AND CONDUCT OF FISHERY AFFAIRS BY THE UNITED STATES

A. The general situation

In previous chapters some note has been taken of the relationship of fishery affairs to general United States ocean policy, the present nature of the United States fish business, a number of specific United States flag fisheries, and the nature of living resources, jurisdiction over them, and concepts for the management of their use held at different levels of government. In this chapter will be considered what might properly be the organization and conduct of fishery affairs by the United States under these circumstances.

It may be humiliating to some for the United States to have dropped from second place to sixth place in the world sweepstakes as the prime fish catcher, but nobody is foolish enough to pay for catching fish simply for the purpose of getting into first place. It would be absolutely wasteful for the United States to emulate Soviet or Japanese activities in the high seas fisheries. It was quite a different set of problems than those two have.

For instance, the United States military is perfectly competent to catch by itself all of the submarines it needs to catch. What with earth-orbiting satellites,

high-flying aircraft, electronically equipped vessels of its own of all sizes, and other modern methods of intelligence gathering, there is not much practical other help that it can ever expect to get from its flag fishing fleet in the overseas area. If better and more numerous domestic fishing fleets are developed this might well produce home useful warning service in coastal and nearby offshore waters, but hardly enough to warrant extra expense for that purpose not capable of intrinsic justification on the basis of improving this element of the United States economy.

The United States clearly has more fish and shellfish in its nearshore waters than it can use in the reasonably near future. It will never catch all the fish and shell fish it wants from these resources, because it wants a good deal of many kinds that do not occur off its coast, or do not occur there in the volume it wants. On the other hand it has such riches of living resources near its coast that it can have a surplus of them to export to earn foreign exchange sufficient to more than pay for what it wants to import. This is not the case with either Japan or Russia.

The United States has a strong, varied and dynamic fish trade. By this term is meant those in the chain above the fishermen and fishing vessel owner, such as the processor, distributor, broker, marketer, etc. An examination of the foregoing material and the state of the art does not indicate any serious problem in this aspect of the fish business requiring elaborate governmental attention to bolster its economic situation. There are internal instabilities in it but those are primarily attributable to changing food habits, shifting raw material bases and slowness to change. Overall it is growing at a good rate and prospering. It has available to it, with little or no effective tariff or other barrier to trade, the ocean resources of the world. Its total market in the United States is the most lucrative, largest, and most rapidly growing and varied market for a fish and shellfish in the world. It has shown itself to be innovative and progressive in developing new products to fill new market needs, and in developing merchandizing methods to peddle the products.

In saying the above it is assumed that present Congressional activity directed toward bringing fish plant and product inspection practices in line with similar standards in the poultry, dairy, and meat industries will emerge soon in practical legislation in this field being adopted. Fish and shellfish, being particularly delicate raw material, need such standards and inspection programs particularly and such legislation is another logical step in securing the safety, wholesomeness, and stability of the nation's fish trade.

In the international field the United States fish trade does not seem to require any assistance from the government other than would flow normally from the government tidying up its own activities to attend better to its own interests in this field, some of which have been mentioned above and others of which will be treated below. As a matter of fact the shoe may well be on the other foot, in that the government might be able to obtain considerable benefit from the activities of the United States fish trade in various foreign areas if it chose to integrate those activities toward its general objectives in this field somewhat more closely.

A considerable amount of emphasis has been given in the past by the Bureau of Commercial Fisheries to treating problems of the domestic fish trade as defined herein. This has been chiefly a result of its representatives being more vocal and ubiquitous than those of the fishing business, *sensu strictu*. There is no need for it to have any attention from the United States Government more than is given normally to other domestic manufacturing and merchandizing fields.

For instance, the marketing assistance which the Bureau of Commercial Fisheries now gives in this field is not of any considerable consequence to the trade as a whole and could very well be tapered off to permit transfer of funding and personnel to problems more directly associated with the development and management of fishery resources and the extractive phases of the industry they support.

It is in the field of the United States flag fishing industry, and primarily that portion of it operating in United States coastal waters, where the domestic problems of the fish business lie and it is to this field that United States remedial measures affecting the fish business should be shifted, concentrated, broadened and strengthened. By concentrating on developing its domestic fisheries on its continental shelf and slope it can strengthen its domestic economy, broaden its readily available food base, reduce its foreign exchange loss, and broaden its expertise in the use of the ocean in manners that will improve its posture among the nations and its ability to help others do the same.

It is reasonably obvious from the above examination of the history of current status of the United States market for fish and shellfish, and the review of the underutilized resources in United States' coastal areas, what opportunities are the best for domestic fishery development.

Given prices competitive with imports, market demand is strong and steadily growing for fish meal; shrimp and crab; tuna; ground fish as fish blocks, sticks, portions, sandwiches, steaks and as fresh or frozen filets (as well as for whole flounder, or "sole"), clams, scallops and oysters; and salmon.

Underutilized resources in coastal waters are particularly large for fish suitable for fish meal production (as well as pet food and fish protein concentrate), small shrimp, crab, ground fish in great variety, and clams and scallops. Vast estuarine areas are admirably adapted by nature to the cultivation of oysters, and presently largely unused. Oysters, clams and salmon all lend themselves to increase in production from coastal waters by application of improved resource management methods and aquaculture.

While such an account would seem to leave out tuna, one of the most important elements of the U.S. fish trade, it does not. The United States tuna fleet is modern and economically in good shape. It is expanding. It is already a capable long-range fleet. If the United States maintains its rights for its fishing vessels to fish on the high seas more than 12 miles from shore, and with its fellow sovereigns supplies appropriate conservation methods to keep high seas tuna resources in good productive condition, there seems to be no reason to expect that the U.S. flag tuna fleet cannot keep productive and in good economic condition.

As has been noted above, and will be dealt with further below, the needed development activities for the domestic fisheries does not seem to need any massive injections of new money, subsidies, or supports. A more rational approach to the management of the use of these common property resources, an elimination of the more outstanding institutional barriers to development, a more effective use of the vast research potentials of the United States, and a more rational organization of the conduct of United States fisheries seems to be needed more than large amounts of new money.

The United States has numerous and large responsibilities in the international field that can be forwarded by the development of fisheries by other countries by their flag vessels. Some of these interests are unique to the humanitarian policies of the United States; some are related to the general posture desirable for it to keep in the comity of nations; some relate to its need for understanding and prediction of planetary forces; some relate to its own food supply; etc. These have been treated somewhat above and will be dealt with below to further extent. These include the following:

1. Improving the nutritional base of countries in the developing world having protein deficiency problems.
2. Assisting the growth of the economies of other countries.
3. Developing resource bases for supplies of raw material to United States industry.
4. Securing longer range diplomatic advantage through establishment of good will in countries whose friendship is advantageous to the United States.
5. Protecting from overfishing the resource base supporting fishing industries in the particular countries, and supplies for United States industry, by the establishment of appropriate research and management facilities for conservation purposes.
6. Improving the scientific basis for predicting events in ocean climate and atmospheric weather.

7. Providing auxiliary back up strength for United States posture in time of stress, either of a regional or total nature.

8. Establishing a workable regime of the Law of the Sea to assure the peaceful increased use of the sea by all, and to maintain public order on the sea.

In furthering the conduct of these international fishery and oceanographic activities that fall out of its general diplomatic policies it is highly desirable that the United States Government integrate its domestic with its international fishery activities as closely as is possible. This is from the standpoint of efficiency and effectiveness and follows from the experience of the large United States firms who have found it quite impracticable to conduct their fish activities in separate international and domestic departments, because the interdigitation between the two is too intimate and detailed to render such an approach practical.

At the present stage of history, as noted both above and below, the prime need in the international aspect of this field is to organize the international activities in

this field more effectively, organize more effectively, the United States ocean use apparatus to interact better with the improved international ocean use apparatus, and to reduce barriers to the full interaction between these two apparatus at all levels. While this will require substantial new funds in the long run the chief present need is to tidy up policy and the machinery for its implementation with only modest amounts of new money. The special needs of the United States fish trade can be safely ignored in this because if the United States attends to its general responsibilities in this international field more effectively the special needs of the United States fish trade will be attended to adequately. It is doing pretty well by itself under present conditions.

B. The Federal fisheries function

Substantive responsibility for commercial fisheries affairs in the United States Government presently rests in the Bureau of Commercial Fisheries of the Department of the Interior, pursuant to the Fish and Wildlife Act of 1956 and other acts. This is entirely too restricted a frame of reference in which to conduct United States policy and its implementation in the management of the use of living aquatic resources at the present date, and it will be quite impossible as new developments in the use of the ocean and the fresh water environment come under the inexorable pressure of new science and technology, new aspirations of United States citizens and humanity in general arise, new pressures on world food supply arise from increasing population, and new pressures from changing world power adjustments develop. The Federal Fishery Function must be broadened and strengthened to a degree that does not fit present or past organization if it is to perform its role in United States society with reasonable effectiveness.

The Federal Fishery Function should be equipped with the following authorities and abilities, for reasons set out both above and below:

1. *Policy*.—There should be a Congressionally adopted policy to cover the total needs of the United States in respect of the multiple use of aquatic resources. The one cited on pages 57 is recommended.

2. *Recreational use domestically*.—The fisheries (aquatic resources) functions presently residing in both the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries of the Department of the Interior, should be combined into one organization, here called the Federal Fishery Function. As noted in the policy referred to above the recreational use of aquatic resources, and their commercial use are both so important in the United States, and so closely interact in all areas of the nation and at all levels, that it is necessary for their administration and governmental support to be much more closely integrated than it is at present.

3. *Environmental Research and its Application*.—Fishing has been conducted heretofore pretty well on the basis of experience and aptitude of the individual fisherman or skipper. The chief reason for this has been that the state of environmental and biological research has been so primitive that predictions that were very useful to the fisherman could not be made. Natural processes were not well enough understood to make this possible. There was little in the way of effective governmental machinery available to transmit what was known in useful and timely fashion to the only person who could use it, the fisherman (or other resource user) at sea.

This situation is changing rapidly as more is learned of the interrelationship of energy flow between sea and air, and the effect of these changes on the biological resources. It will change more rapidly with the implementation of the World Weather Watch of the World Meteorological Organization, the Global Atmospheric Research Program of the WMO, the International Global Ocean Station System of the Intergovernmental Oceanographic Commission, the World Resources Appraisal of the FAO Department of Fisheries, the International Decade for Ocean Exploration now proposed by the United States, the Expanded Program for International Cooperation in Ocean Affairs now being proposed by the Secretary General of the United Nations, and the varied scientific and technological inputs from dozens of other international, intergovernmental, non-governmental, and national agencies and institutions dealing with the ocean and the atmosphere.

The National Sea Grant College Program now in the National Science Foundation is beginning to bring a whole new look to means of translating the input from these new sources of science and technology to the users at sea in timely manner and in form they can readily understand and use.

The environmental and biological numerical data from all these multiple new sources are arriving at the National Ocean Data Center in enormous volume and

for their efficient archiving and retrieval for use the most intimate relationship must be established between such data centers and their users.

The United States Coast Guard in the Department of Transportation is becoming an important originator of ocean information as well as a protector of life at sea and an enforcer of public order at sea.

The environmental services of the U.S. Coast and Geodetic Survey, the U.S. Weather Bureau, the Sea-Air Interaction Laboratory, and some related functions of the Bureau of Standards were recently joined together in the Environmental Sciences Services Administration of the Department of Commerce.

There is so much community of need and function among these civilian activities related to the ocean now situated in other parts of the Government and the Federal Fishery Function described above, that all of them (together with some other activities, such as the Beach and Erosion Board) should be combined in the same Department of Government so that there would be a more efficient division of labor among them, and so that they could more effectively serve the civilian needs respecting ocean affairs.

Whether this be a new Department of the Oceans, a new Independent Agency, or be lodged in an existing Department of Government (such as Commerce, Interior, or Transportation) is not so important as the need to group these elements and functions into a single overall agency where the full impact of the civilian aspects of ocean use can be focused.

4. *Central Intergovernmental Oceanic Organization.*—For ten years the ocean science community of the United States has strongly recommended the establishment of a World Oceanographic Organization as a specialized agency of the United Nations in which could be focused all the international aspects of ocean science and technology. In the last two years this strong recommendation has been broadened in international as well as domestic support of the concept of a Central intergovernmental Oceanic organization within the United Nations framework to deal with all international aspects of ocean investigations and the uses of the sea. Strong support for this broadened concept has developed among the affected agencies of the United States, within the United Nations structure, in the governments of other nations, and in the international scientific community.

It is obvious that such a specialized agency respecting the ocean will be established in the fullness of time, and probably rather sooner than later, because of pressing need among the nations to deal more effectively with rapidly growing international aspects of ocean investigations and use. The argument grows as to whether this should be created along disciplinary lines or along functional lines. If the former were adopted there would be, in the first place, a junction between the Intergovernmental Oceanographic commission of UNESCO and the oceanic parts of the World Meteorological Organization. If the latter were followed there would be a merging of IOC with FAO's Department of fisheries and Committee on Fisheries.

It is quite obvious that the world has passed the point where such a central intergovernmental oceanic organization will be formed to attend only to international aspects of science, and that when this is all shaken out such an organization will be concerned with the international aspects of ocean use as well. In such an event it is equally obvious that the international fishery function will be transferred from FAO to the new agency if only because the fish and shell-fish production from the ocean is so much more valuable than all other resources produced from the ocean, is of much more wide spread practical interest to United Nations members than other resources, and is growing so rapidly.

This new step in international oceanic organization will not be taken for an indeterminant time yet. In the meantime the international ocean science function is centered in the Intergovernmental Oceanographic Commission. It is in the process of being broadened and strengthened. The international fishery function is lodged in Department of Fisheries of FAO. It has been in the process of being broadened and strengthened since 1965.

In this interim the Joint Civilian Ocean Agency recommended above for the United States Government should have lead agency responsibility in dealing with the Intergovernmental Oceanographic Commission, in consultation with the Department of the Navy, the National Science Foundation, and the Department of State. The Federal Fishery function described above should have lead agency responsibilities, in consultation with the Department of Agriculture and the Department of State, in dealing with the Department of Fisheries and Committee on Fisheries of FAO. It is in the Federal Fishery Function, as described, that the professional governmental expertise in fishery science, development, management and administration will reside.

5. *Responsibility for Diplomatic Aspects of the International Ocean Affairs of the United States Government.*—The function and purpose of the Department of State is to translate into foreign policy and its implementation the technical competence in particular fields of other agencies of the Federal Government. It has diplomatic expertise and competence but is not provided with technical competence in depth, for which it must rely on other appropriate government Departments and agencies.

The international aspects of United States ocean activities have been more confused and generally ineffective even than the domestic aspects.

The brightest spot has been the Office of the Special Assistant to the Secretary for Fisheries and Wildlife within its narrow lead agency field, which is the field of negotiating conservation agreements and other international activities relating to disputes over fishery jurisdiction. It does not have lead agency responsibility in dealing with fishery or ocean matters with the United Nations and its specialized agencies (United Nations Development Program, Resources and Transportation Division), (which is lodged in the Legal Advisor's Office); trade matters (which is lodged elsewhere in the Department); ocean science (which is partially handled by International Science and Technical Affairs); ocean transportation (which is handled otherwise); etc.

It is recommended that the Office of Special Assistant to the Secretary for Fisheries and Wildlife in the Department of State be broadened and strengthened with duties assigned commensurate with a new title "Office of the Special Assistant to the Secretary for Ocean Affairs".

6. *Responsibility for the Technical Aspects of International Fishery Activities of the United States Government.*—Technical assistance internationally in fisheries is handled by USAID, and it has been assigned responsibility for the Food from the Sea Program. The Department of Agriculture has lead responsibility in dealing at a technical level with FAO. Various other parts of the United States Government have lead responsibility in dealing with other parts of the United Nations and its specialized agencies, the Organization of American States, the Organization for African Unity, the European Economic Community, and other regional international organizations and agencies. The Bureau of Commercial Fisheries, from its present location in the Department of the Interior and under its present statutory authority is hesitant to involve itself with United States fishery firm activities abroad.

Professional expertise in fishery science, development, management, technology, and administration rests now in the Bureau of Commercial Fisheries in the Federal Government and will reside in the Federal Fishery Function as defined above.

It is recommended that the Federal Fishery Function, in consultation with the Office of the Special Assistant to the Secretary for Ocean Affairs in the Department of State, be given lead agency role in all technical aspects of international fishery activities of the United States, including the Food from the Sea Program. It should be as responsible and responsive in dealing with United States fishing industry activity in the international and foreign field as it is in the domestic field. It should deal for the United States on technical fishery matters before FAO, IOC, UNDP, World Bank and related agencies, and regional international bodies. It should follow and promote the technical fisheries interests of the United States as freely and actively in the external as in the internal field.

7. *Management of the use of Living Aquatic Resources.*—The Federal Fishery Function must have the clear authority and responsibility in the ultimate instance for the management of the use of living aquatic resources within the jurisdiction of the United States in accordance with the policy set out in point 1 above. The United States can have no policy for the management and use of living aquatic resources so long as authority for this is split between fifty independent state governments and the Federal Government.

Note has been made of the major resources of Pacific sardine, Pacific mackerel, and menhaden where the commercial fishery has been eliminated or severely reduced in production because there was no clear governmental authority or responsibility for applying existing scientific understanding and modern resource management practices to the resource. This condition cannot continue. There is no marine living resource too large to suffer the same fate. The enormous Peruvian anchovy population was at the point of maximum sustainable yield within ten years of the time the fishery began.

The State Governments now have this authority but have not accepted the responsibility in all cases when needed. Where several states are involved in

the same fishery there is normally paralysis of management activity. The formula should be adopted like that of the water pollution act where initial authority for living aquatic resource management lies with the State, but in case agreement cannot be reached, or insufficient action is taken, the Federal Fishery Function can assume paramount authority under the criteria laid out in point 1 above.

The first objective of management should be to assure that fishing effort on a stock must not exceed the level corresponding to the maximum sustainable yield. The second objective should be, in fisheries reaching this stage, to manage the fishery in such a manner as to maximize the net economic yield therefrom as fully as is practical. The regulation of fisheries for social purposes to spread the wealth—should be eliminated whenever politically possible, and emphasis given to taking permissible volumes of fish and shellfish from particular stocks by the most economically efficient methods possible.

8. *Development of the Full Use of Resources.*—The Federal Fishery Function must have the clear authority and responsibility in the ultimate instance for the development of the full use of living aquatic resources within the jurisdiction of United States, in accordance with the terms of the policy in point 1 above. Again initial responsibility can reside in the state governments, as in the water pollution act, with final responsibility in the Federal Fishery Function.

9. *Resource Assessment.*—The Federal Fisheries Function should pursue a vigorous policy of exploring, assessing the extent, and establishing the commercial and recreational possibilities of harvesting, of particular living resources on the continental shelf and slop adjacent to the United States, or available to harvest by citizens of the United States in the high seas. It should do this by a combination of biological, environmental, exploratory fishing, gear development and vessel development research. It should do this through its own efforts, and by stimulation of companion research in the other appropriate federal agencies (such as the Navy, Maritime Administration, Atomic Energy Commission, National Science Foundation, etc.), the fishery agencies of the State Governments, and the academic community.

It should also pursue its own research programs, while cooperating with international efforts along the same lines, of making better estimates of total food production possibilities, both regional and ocean wide, together with exploring new techniques for the rapid preliminary assessment of stock size and potential yield where new fishery developments are contemplated.

The results of all such research should be promptly promulgated not only as completed research projects but as preliminary results from time to time in form useful to the interested public.

10. *Economic Research.*—The Federal Fishery Function must strengthen materially its economic research capabilities.

Present statistical data on the fisheries of the United States are inadequate for biological, technological, and economic research needs. There is no realistic system for obtaining the production statistics of recreational fishing, estimating its economic (and dietary) value, or estimating the fishing pressure.

The economic theory underlying fishery management practices is very imperfect. The detailed knowledge of economic forces at work in particular fisheries is rudimentary. Accordingly, at the present time, neither the application of aids to promote development, nor constraints to provide for conservation, can be done in a sensible, efficient manner. More frequently than not, heretofore, constraints adopted for conservation purposes have created more economic damage than they have conservation good.

The relation of costs in United States flag fisheries with those in competing fisheries and nations is known in such a fragmentary way that it is generally fruitless to attempt gaining international agreement to constraints required for conservation regulation in international fisheries for lack of understanding of relative economic impact of such constraints on different parts of the fishery. For the same reason it is not possible to know what aids may be needed, for what period of time, to counteract foreign moves to make their fishery economically more competitive. Lastly, for lack of economic research it is not possible to plan very efficiently what domestic fisheries can be developed most economically to fill United States market desires.

The economic research program of the Federal Fisheries Function should reach into all branches of its activities, and particularly, use academic economic research capabilities as fully as possible by grants and subsidies.

11. *Change in Thrust of Effort.*—The Federal Fishery Function should limit its service functions to the processing, distributing and marketing section of the

domestic fish trade to government services normally given other segments of the food trade (such as statistical services, inspection services to protect wholesomeness of product, etc.), and divert the chief thrust of its domestic program to assisting the development of fisheries by U.S. flag vessels, and the improvement in profitability of those existing.

The main thrust of such development work should be centered on those fisheries for which there is ample supply in U.S. coastal waters and ample market in the United States. Attention should be given to stimulating use of underutilized resources for which there is growing market both domestic and foreign. Liberal funds should be made available for pump priming activity in the initial years of development of such fisheries. Major resources now known which merit such attention are anchovy, thread herring and calico scallop in the South Atlantic-Gulf of Mexico area; anchovy, jack mackerel and squid off southern California; hake, saury and ocean perches off southern California, Oregon and Washington; pollack, ocean perch, flat fishes, cods, pink shrimp, scallop, and crabs in Alaska.

12. *Animal Protein for Nutritional Value.*—Interest in fisheries in the United States has centered historically, and still does, on fish for direct human consumption and values at high level because of taste, texture and appearance. In the meantime the market use of fish in the United States has gravitated contrarily to products sold for their nutritional (chiefly well rounded protein) value, and more than half of the fish used in the United States is now consumed in that form.

The first sort of fish are normally carnivores rather high up in the trophic scale and naturally of low abundance relatively in any particularly habitat. The sort of fish and shellfish used for the latter purpose are those lower in the trophic level, naturally more abundant in any habitat, and normally underutilized because of the intense effort to catch higher priced fishes for direct human consumption. Since the proteins of substantially all fish and crustacea have substantially identical nutritional value and a well balanced amino-acid profile containing those nutritional elements required by all animals, advantage is taken of these most abundant lower trophic animals by reducing them to a form that can be economically used in animal diets as protein sources on the basis of nutritional value rather than the subjective and costly values of texture, taste and appearance.

Although the most common form of doing this is making fish meal, fish solubles and minced frozen fish are other important presently utilized forms. Although such products are chiefly used in the United States presently for animal feeding (fish, poultry, swine, fur bearers, pet and bait) such products as minced frozen whole fish are increasing sharply in use for direct human consumption in Japan, fish sauces are widely used as a condiment in Southeast Asia, and fish protein concentrate has enormous potential in the United States and on a world basis as an additive for nutritional values to formulated foods made from cheaper materials higher in calories content but deficient in one or more essential amino-acids.

The Federal Fishery Function should vigorously strengthen its entire program (resource assessment, exploratory fishing, gear development, processing technology, economic research, etc.) aimed at making these very abundant and cheaply caught resources in United States coastal waters available for as broad a spectrum of uses as possible, not only in the United States but in foreign markets. It is in this field that aids of a pump priming sort should be concentrated in order to assist in bringing the use of these underutilized resources into the economy.

13. *Incentives to Development of U.S. Flag Fishing.*—Fishermen fish for money not for fish. When profits are good in a fishery new vessels flow into it automatically unless artificially restricted, fleets and gear and methods are automatically updated and modernized, vigorous young men are attracted into the trade, skills are constantly improved, and length of time at sea becomes less important. When profits are poor vessels and men in the fleet become overage, obsolete, and less efficient, and crews will not stay at sea to work.

Almost nobody goes to sea to work if he can make as much income at some other job ashore. No firm makes money from the activities of poor fishermen: only rich fishermen make money for themselves, the firms that use their product, and the community.

There must be economic incentive if competent men are going to go to sea and work the fisheries. Sea fishing has a bad connotation economically in the United States so that capital is difficult of access even to prosperous fishermen.

Risks are high because of uncertainties of weather, sea state, resource availability, competitive thrusts from imports, the common property nature of most of the resources, and governmental regulation of the activity, or the lack of such regulations. These risks look particularly high to bankers not acquainted with the sea and accustomed to providing capital for the development of resources that are privately owned.

To the extent that the United States wishes a particular fishery, or the entire U.S. flag fishery, developed it must provide economic climate and economic incentive favorable to the purpose.

The most immediately effective and constant economic incentive is relief from taxes. This has been, and is, broadly used to increase petroleum and mineral extraction, and despite complaints from other sectors of the economy it has been efficient from the standpoint of the total economy and effective for the public purpose. The United States has the strongest petroleum industry in the world and the beneficial effects of this on the posture of the United States in the World, and the strength of the energy base for its whole economy, well replaces the loss in tax base. No general incentive would more quickly stimulate production by U.S. flag fishing vessels than appropriate modification of the industry's tax base along the line of the depletion allowance granted petroleum and mineral producers.

A principle purpose of environmental and biological research as applied to the fisheries is to increase ability to predict resource availability and by doing so diminish economic risk in the enterprise.

The state of the art in these research fields does not permit very precise such predictions and this is a principal reason why access to capital for vessel construction and gear acquisition is so difficult for fishermen. Efficiency in catch by modern vessels is continuously requiring higher capital investment per fisherman, or per ton of production. Fishermen must have capital to improve their efficiency.

The Fishermen's Loan Program and the Fishing Vessel Mortgage Insurance program have been both very effective in improving incentives for U.S. flag fishing and at nominal cost to the government. Not only have these programs enabled fishermen to modernize their equipment, it has relieved bankers of often onerous requirements of State Bank Examining codes inimical to the fishing business, and has removed the fishing vessel owner from dependence for capital on his customers, thus eliminating beneficially certain bad aspects of the padrone system in some fisheries. These programs are used so much and so effectively that they sometimes run out of authorization for funds. As one of the most effective means of providing economic incentive to U.S. flag fishing at cheapest cost to government the authorization limits for these programs should always be kept higher than demand.

Experience on a broad and long basis in United States fisheries indicates that there is no judge of what sort of vessel and gear is needed in a particular fishery, and will work to best economic advantage in it, than a fisherman-operator-owner who derives a fair part of his total earnings from profit on the use of the capital in the vessel and gear. That is a main reason why these programs have worked so well.

These programs have operated on a tight credit basis designed to yield a slight profit. One of the most efficient ways to stimulate vessel modernization in a particular fishery that it is desired to develop would be to relax these controls somewhat in that particular fishery. The Federal Fishery Function should be authorized to do this differentially in fisheries under appropriate criteria.

An apparently effective tool in pump priming to get a fishery started toward profitability is to provide incentive payments to fishermen to cover the difference in his costs and the processor's ability to pay in the experimental phases of a fishery's development. This has been used experimentally in the hake fishery off Washington and the fish meal business in the Gulf of Mexico, but on too limited a time basis to explore fully the methodology or effectiveness of such a tool. The Federal Fishery Function should be provided with substantial funds for such purpose, and authority to use it in this manner under appropriate criteria.

The ground fish fishery of the United States was deliberately written off by the United States Government shortly after World War II for supervening national reasons. These reasons were the necessity to quickly revive the economies of war torn allies or friends. Those supervening reasons no longer obtain. This policy should be revised and restitution made. At the same time some of these countries (and particularly Canada) have instituted heavy subsidization of their own ground fisheries which gave the product of those fisheries a prefer-

ential position in the United States market not growing out of natural competitive forces or abilities. The market for ground fish in the United States has grown rapidly, even to the extent of exacerbating the United States' problems of balance of payments. Ground fish resources off the coast not possible of use by U.S. flag fishermen are increasingly fished by foreign fishermen with the product frequently coming into the United States market.

The Federal Fishery Function should be provided funds and authority to mount a concerted drive for a ten year period to revive the ground fish fisheries of the United States. This program should include for this period of time authority to provide vessel construction subsidies and other supports fully equivalent to Canadian supports in these fields.

14. *Use of the Academic Community.*—Other agencies of the United States Government (NASA, NAVY, AEC, NSF) have used the academic community with great success, and tremendous benefit to the nation, through grants and contracts. This has been so successful that it has materially affected the entire higher educational system in the United States and the economy and posture of the nation.

This enormously valuable tool has been very sparingly available to the U.S. flag fisheries for two reasons. The National Science Foundation has interpreted its mandate for the support of basic research in such a manner that research program proposals from the academic community related to commercial fisheries were referred by it to the Bureau of Commercial Fisheries. Most of the Bureau of Commercial Fisheries funds were tied to particular projects, Bureau laboratories did not appreciate competition from academic laboratories for these funds, and the directives under which the Bureau operated were somewhat uncertain in this field.

(a) *Oysters, Clams and Mussels.*—Oysters, clams and mussels are excellent vectors of human disease bacteria and viruses. These are ingested in the normal feeding process if available in the environment, and ordinarily carried by the animal with no damage. Oysters and clams in particular thrive where there is some pollution by human wastes. Very large areas of excellent mollusc farming lands are removed from use by these public health problems. The public Health Service and the Bureau of Commercial Fisheries are well advanced on the development of depurating methods.

Industrial pollution is often more damaging to the sensitive molluscs than human waste pollution. Copper and other high molecular weight metals are particularly poisonous to them in exceedingly slight concentration. It is not at all certain that the waves of epidemic diseases that have affected broad areas of mollusc producing areas are not induced by the weakened condition of the animals deriving from pollutants in undetectable amounts.

Silting and the destruction of shell beds have destroyed the possibility of mollusc culture in broad coastal areas by eliminating clean cultch for the embryo's to set on (oysters) or smothering them before they can grow.

Farming is not practiced where the farmer does not have control over and ownership of the product and land. Tideland tenure laws do not permit this in many states with excellent aquaculture possibilities.

The Federal Fishery Function should work toward eliminating these and other barriers to the farming of oysters, clams and mussels.

(b) *Salmon and Trout.*—Salmon and sea-run trout form particularly fine subjects for aquaculture and this is held back almost entirely by institutional barriers.

The Federal Fishery Function should be given authority and funds to experiment with the aquaculture production of salmon and sea-run trout on a commercial basis involving private control of a whole river system, full authority to harvest the result by any method (including lease of sport fishing rights), and encouragement to selectively breed efficient stocks.

This could readily be initiated and explored with light social interaction on small coastal streams, especially in Alaska but also is the other west coast states, and particularly on streams all, or mostly, included within federally owned lands.

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TABLE 1.—CATCH OF FISH AND SHELLFISH, 1926-67

Year	Catch for human food ¹	Catch for industrial products ^{1 2}	Total ¹	Average price per pound	
				Million dollars	Cents
1926	2,198	673	2,871	(3)	(3)
1927	2,172	634	2,806	(3)	(3)
1928	2,370	691	3,061	(3)	(3)
1929	2,601	890	3,491	(3)	(3)
1930	2,478	746	3,224	109	3.39
1931	2,129	501	2,630	77	2.94
1932	1,864	748	2,612	56	2.13
1933	2,086	911	2,997	(3)	(3)
1934	2,434	1,670	4,104	(3)	(3)
1935	2,583	1,552	4,135	(3)	(3)
1936	2,854	1,972	4,826	(3)	(3)
1937	2,703	1,650	4,353	101	2.32
1938	2,639	1,615	4,254	94	2.20
1939	2,713	1,732	4,445	97	2.17
1940	2,675	1,385	4,060	99	2.44
1941	3,062	1,838	4,900	129	2.63
1942	2,683	1,192	3,875	170	4.40
1943	2,737	1,425	4,162	204	4.90
1944	2,865	1,668	4,533	213	4.79
1945	3,167	1,431	4,598	270	5.87
1946	3,049	1,418	4,467	313	7.01
1947	3,020	1,329	4,349	312	7.16
1948	3,146	1,367	4,513	371	8.22
1949	3,305	1,499	4,804	343	7.13
1950	43,307	1,594	4,901	347	7.09
1951	3,048	1,385	4,433	365	8.23
1952	2,778	1,654	4,432	364	8.20
1953	2,519	1,968	4,487	356	8.94
1954	2,705	2,057	4,762	359	7.55
1955	2,579	2,230	4,809	339	7.05
1956	2,690	2,578	5,268	372	7.06
1957	2,475	2,314	4,789	354	7.39
1958	2,651	2,096	4,747	373	7.86
1959	2,369	2,753	5,122	346	6.76
1960	2,498	2,444	4,942	354	7.15
1961	2,490	2,697	5,187	362	7.98
1962	2,540	4 2,814	4 5,354	396	7.40
1963	2,556	2,921	4,847	377	7.78
1964	2,497	2,044	4,541	389	8.57
1965	2,587	2,190	4,777	445	9.33
1966	2,572	1,792	4,364	4 472	4 10.82
1967	2,385	1,677	4,062	438	10.79

¹ In million pounds.

² Processed into meal, oil fish solubles, homogenized condensed fish, shell products, and used as bait and animal food.

³ Not available.

⁴ Record.

Note: Does not include data on the Hawaiian catch prior to 1946.

TABLE II.—RELATIVE VOLUME OF THE CATCH, BY SPECIES, 1966

Species	Quantity	Percent of total	Record catch	
			Year	Amount
Menhaden.....	1,307,710	30.0	1962	2,347,944
Salmon.....	387,749	8.9	1936	790,884
Crabs.....	372,425	8.5	1966	372,425
Tuna.....	269,180	6.2	1950	391,454
Shrimp.....	239,046	5.5	1954	268,334
Industrial fish ¹	196,318	4.5	1965	265,438
Flounders.....	174,520	4.0	1965	180,121
Haddock.....	132,288	3.0	1929	293,809
Herring, sea.....				
Atlantic.....	72,229	1.7	1902	200,598
Pacific.....	24,107	.5	1937	263,200
Total.....	96,408	2.2		
Whiting.....	90,408	2.1	1957	133,041
Alewives.....	87,445	2.0	1908	89,978
Ocean perch, Atlantic.....	81,552	1.9	1951	258,320
Clams.....	72,751	1.7	1966	72,751
Anchovies.....	62,284	1.4	1953	86,044
Oysters.....	51,223	1.2	² 1908	152,046
Cod:				
Atlantic.....	37,576	.9	1880	294,351
Pacific.....	9,983	.2	1915	32,681
Total.....	47,559	1.1		
Musser shells.....	46,361	1.1	1908	81,869
Jack mackerel.....	41,119	.9	1952	146,522
Halibut, Pacific.....	40,326	.9	1915	66,696
Mullet.....	38,025	.9	1902	43,385
Catfish and bullheads.....	34,656	.8	1963	38,614
Carp.....	32,348	.7	1908	42,659
Lobster, northern.....	29,541	.7	1960	31,168
Scup or porgy.....	28,355	.6	1960	49,229
Rockfishes.....	25,529	.6	1945	57,686
Mackerels.....	24,630	.6	(³)	(³)
Ocean perch, Pacific.....	21,864	.5	1965	28,352
Squid.....	21,735	.5	1946	40,266
Bonito.....	19,271	.4	1966	19,271
Buffalofish.....	18,034	.4	1950	25,873
Scallops, sea.....	15,975	.4	1961	27,461
Snapper, red.....	13,317	.3	1902	23,457
Hake, Pacific.....	11,833	.3	1966	11,833
Chubs.....	10,149	.2	1960	16,854
Striped bass.....	9,124	.2	1961	9,495
Pollack.....	9,018	.2	1938	40,694
Swellfish.....	8,658	.2	1965	13,403
Grouper.....	8,358	.2	1965	9,570
Lingcod.....	7,959	.2	1944	14,262
Sheephead.....	7,355	.2	1959	13,644
Shad.....	7,305	.2	1890	43,000
Sablefish.....	6,931	.2	1945	17,750
Yellow Perch.....	6,741	.2	1934	16,282
Sea Trout or Weakfish, spotted.....	6,401	.1	1936	8,800
Spot.....	5,973	.1	1952	15,863
Butterfish.....	5,928	.1	1939	17,151
Lobster, Spiny.....	5,844	.1	1965	6,237
Bluefish.....	5,484	.1	⁴ 1897	22,673
King Whiting or Kingfish.....	4,997	.1	1965	5,708
Sea Bass, Black (Atlantic).....	4,859	.1	1952	21,997
Whale products ⁵	4,689	.1	(³)	(³)
Herring, Lake.....	4,575	.1	1899	59,914
Smelt.....	4,384	.1	1958	13,303
Irish Moss.....	4,100	.1	1961	6,995
Unclassified.....	93,489	2.1		
Total.....	4,364,106	100.0		

¹ Unclassified species for bait, reduction and animal food.² First year in which an oyster was made in all regions.³ Data not available.⁴ Includes data on New England catch in 1898.⁵ Since data are not available on the poundage of whales taken, statistics on the yield of these mammals represent the weight of the whale products which include meals, meat, and oil.

TABLE III.—RELATIVE VALUE OF THE CATCH, BY SPECIES, 1966

Species	Value (thousand dollars)	Percent of total	Record value and year	
			Year	Value (thousand dollars)
Shrimp.....	96,296	20.4	1966	96,296
Salmon.....	73,595	15.6	1966	73,595
Tuna.....	44,841	9.5	1950	61,342
Crabs.....	33,027	7.0	1966	33,037
Oysters.....	27,373	5.8	1961	33,204
Lobsters.....	22,266	4.7	1966	22,266
Menhaden.....	21,767	4.6	1956	28,425
Flounders.....	20,170	4.3	1966	20,170
Clams.....	18,551	3.9	1966	18,551
Haddock.....	13,943	3.0	1966	13,943
Halibut, Pacific.....	9,708	2.1	1962	11,579
Scallops, sea.....	7,625	1.6	1965	13,182
Catfish and bullheads.....	6,941	1.5	1966	6,941
Snapper, red.....	4,334	.9	1966	4,334
Whiting.....	3,955	.8	1951	2,903
Mussel shells.....	3,737	.8	(1)	(1)
Cod:				
Atlantic.....	3,196	.7	1948	4,742
Pacific.....	518	.1	1959	664
Total.....	3,714	.8		
Ocean perch, Atlantic.....	3,425	.7	1951	12,597
Scup or porgy.....	3,326	.7	1966	3,326
Lobster, spiny.....	2,882	.6	1965	3,626
Industrial fish ²	2,606	.6	1963	3,044
Mullet.....	2,577	.6	1945	4,647
Mackerels.....	2,404	.5	(1)	(1)
Buffalo fish.....	2,213	.5	1952	3,564
Herring, sea:				
Atlantic.....	1,434	.3	1948	3,798
Pacific.....	591	.1	1947	2,152
Total.....	2,025	.4		
Chubs.....	1,880	.4	1958	2,564
Scallops, bay.....	1,672	.4	1966	1,672
Striped bass.....	1,654	.4	1966	1,654
Sea trout or weakfish spotted.....	1,633	.3	1952	1,781
Jack mackerel.....	1,512	.3	1952	4,755
Rockfishes.....	1,412	.3	1945	2,648
Alewives.....	1,328	.3	1966	1,328
Ocean perch, Pacific.....	1,105	.2	1965	1,334
Groupers.....	1,078	.2	1966	1,078
Carp.....	1,028	.2	1951	2,007
Whitefish, common.....	986	.2	1948	3,784
Shad.....	920	.2	1945	2,680
Abalone.....	920	.2	1966	920
Yellow perch.....	812	.2	1958	1,540
Swordfish.....	804	.2	1946	1,435
Pompano.....	801	.2	1966	801
Bonito.....	771	.2	1947	1,636
Bloodworms.....	735	.2	1964	804
Sea bass, black (Atlantic).....	709	.1	1952	5,206
Squid.....	680	.1	1947	1,370
Sablefish.....	669	.1	1946	1,834
Bluefish.....	647	.1	1951	760
Anchovies.....	645	.1	1933	1,712
Sandworms.....	596	.1	1966	596
Butterfish.....	541	.1	1962	1,005
Yellow pike.....	541	.1	1951	2,152
Crawfish fresh-water.....	539	.1	1965	1,039
XXXXXXX.....	511	.1	1945	1,819
XXXXXXX.....	498	.1	1946	1,014
Unclassified.....	11,390	2.4		
Total.....	472,238	100.0		

TABLE IV.—IMPORTS OF FISHERY PRODUCTS, 1950-67

[In thousands]

Year:	Edible		Nonedible (value)	Total value
	Pounds	Value		
1950.....	639,725	158,414	\$39,882	\$198,296
1951.....	646,668	158,363	54,094	212,457
1952.....	705,118	183,121	57,308	240,429
1953.....	726,195	195,869	49,611	245,480
1954.....	804,054	203,722	48,687	252,409
1955.....	780,185	208,973	49,896	258,869
1956.....	801,655	234,699	48,031	282,730
1957.....	900,227	252,788	46,487	299,275
1958.....	1,020,326	283,822	46,959	330,781
1959.....	1,141,114	314,650	55,467	370,117
1960.....	1,095,014	310,596	52,685	363,281
1961.....	1,087,175	339,318	61,301	400,619
1962.....	1,255,532	405,832	83,975	489,807
1963.....	1,196,977	399,928	100,784	500,712
1964.....	1,318,099	433,674	130,569	564,243
1965.....	1,398,778	479,412	121,492	600,904
1966.....	¹ 1,593,359	¹ 568,216	152,231	¹ 720,447
1967.....	(²)	³ 531,900	³ 155,300	³ 687,200

¹ Record.² Not available.³ Preliminary.

Source: Department of Commerce, Bureau of the Census.

TABLE V.—EXPORTS OF DOMESTIC FISHERY PRODUCTS, 1950-67

[All amounts in thousands]

Year	Edible		Nonedible (value)	Total (value)
	Pounds	Value		
1950.....	121,623	\$18,856	\$8,618	\$27,474
1951.....	165,624	27,072	8,659	35,731
1952.....	62,056	15,511	6,436	21,947
1953.....	69,308	17,084	10,794	27,878
1954.....	62,724	16,238	15,289	31,527
1955.....	109,750	24,923	15,054	39,977
1956.....	101,918	22,939	16,564	39,503
1957.....	85,221	20,549	15,403	35,952
1958.....	65,468	19,440	11,564	31,004
1959.....	80,688	26,747	17,495	44,242
1960.....	61,454	25,622	18,543	44,165
1961.....	40,137	19,594	15,116	34,710
1962.....	56,530	22,470	13,258	35,728
1963.....	64,745	30,376	26,229	56,605
1964.....	94,835	42,878	21,326	64,204
1965.....	96,444	49,308	20,175	69,483
1966.....	109,604	62,882	21,931	84,813
1967.....	107,939	67,525	14,684	82,209

Source: Department of Commerce, Bureau of the Census.

TABLE VI.—SUPPLY OF FISHERY PRODUCTS, 1957-57

(Round-weight basis)

Year	Domestic catch		Imports		Total million pounds
	Million pounds	Percent	Million pounds	Percent	
1957	4,789	66.8	2,375	33.2	7,164
1958	4,747	63.1	2,779	36.9	7,526
1959	5,122	60.5	3,338	39.5	8,460
1960	4,942	60.1	3,281	39.9	8,223
1961	5,187	54.2	4,383	45.8	9,570
1962	² 5,354	51.4	5,054	48.6	10,408
1963	4,847	42.4	6,587	57.6	11,434
1964	4,541	37.7	7,490	62.3	12,031
1965	4,776	45.3	5,758	54.7	10,534
1966	4,364	35.0	8,103	65.0	12,467
1967	4,062	28.6	² 10,125	71.4	² 14,187

¹ Excludes imports of cured cod into Puerto Rico, but included landings of foreign-caught tuna in American Samoa.² Record.

TABLE VII.—SUPPLY OF INDUSTRIAL FISHERY PRODUCTS, 1957-67

(Round-weight basis)

Year	Domestic catch		Imports		Total, million pounds
	Million pounds	Percent	Million pounds	Percent	
1957	2,314	73.9	818	26.1	3,132
1958	2,096	65.3	1,116	34.7	3,212
1959	2,753	65.7	1,437	34.3	4,190
1960	2,444	61.7	1,515	38.3	3,959
1961	3,697	51.5	2,538	48.5	5,135
1962	12,814	48.9	2,939	51.1	5,753
1963	2,291	34.5	4,340	65.5	6,631
1964	2,044	28.6	5,114	71.4	7,158
1965	2,190	40.8	3,182	59.2	5,512
1966	1,792	25.5	5,244	74.5	7,066
1967	1,677	18.4	¹ 7,442	81.6	¹ 9,119

¹ Record.

Note: The weights of the domestic catch and imports represent the live (round) weights of all items except bivalve mollusks (conchs, clams, oysters, scallops, etc.) which are shown in the weight of meats, excluding the shell.

TABLE VIIIa.—SUPPLY OF GROUND FISH AND ATLANTIC OCEAN PERCH FILLETS, 1957-67

Year	U.S. production		Imports ¹		Total thousand pounds
	Thousand pounds	Percent	Thousand pounds	Percent	
1957	96,650	40.7	140,678	59.3	237,328
1958	99,074	40.3	146,589	59.7	245,663
1959	91,133	33.0	184,837	67.0	275,970
1960	93,818	37.6	155,550	62.4	249,368
1961	93,039	32.3	195,099	67.7	288,138
1962	93,625	29.7	221,420	70.3	315,045
1963	83,419	26.5	231,768	73.5	315,187
1964	75,166	23.4	246,569	76.6	321,735
1965	77,180	20.7	294,954	79.3	372,134
1966	75,418	19.3	² 315,097	80.7	² 390,515
1967	71,032	20.0	283,570	80.0	354,602

¹ Includes imports of frozen blocks of groundfish.² Record. (The record U.S. production amounted to 148,786,000 pounds in 1951).

TABLE VIIIb.—SUPPLY OF FILLETS, STEAKS, ETC., OTHER THAN GROUND FISH AND ATLANTIC OCEAN PERCH, 1957-67

Year	U.S. production		Imports		Total thousand pounds
	Thousand pounds	Percent	Thousand pounds	Percent	
1957	57,815	47.7	63,300	52.3	121,115
1958	56,801	47.5	62,688	52.5	119,489
1959	56,104	46.4	64,802	53.6	120,906
1960	59,348	49.0	61,713	51.0	121,061
1961	65,073	49.2	67,167	50.8	132,240
1962	76,361	50.0	76,443	50.0	152,804
1963	82,565	54.5	68,869	45.5	151,434
1964	85,955	53.9	73,554	46.1	159,509
1965	¹ 91,652	55.1	74,724	44.9	166,376
1966	90,472	49.4	¹ 92,708	50.6	¹ 183,180
1967	82,108	49.2	84,859	50.8	166,967

¹ Record.

TABLE IX.—SUPPLY OF CANNED TUNA 1960-67

[Pounds in thousands]

Year	United States pack from domestic catch ¹		United States pack from imported fresh and frozen tuna ²		Total, pounds	Imported canned		Total supply pounds
	Pounds	Percent	Pounds	Percent		Pounds	Percent	
1960	142,638	40.4	158,750	45.0	301,388	51,755	14.6	353,143
1961	163,853	44.4	146,759	39.7	310,612	58,663	15.9	369,275
1962	147,586	37.6	187,920	47.9	335,506	56,719	14.5	392,225
1963	160,822	41.8	165,890	43.2	326,712	57,494	15.0	384,206
1964	154,208	38.1	195,626	48.4	349,834	54,647	13.5	404,481
1965	161,515	39.5	196,890	48.1	358,405	50,961	12.4	409,366
1966	153,231	3.36	³ 241,037	52.9	³ 394,268	61,960	13.5	³ 455,828
1967	³ 183,382	40.4	25,463	45.2	388,845	³ 65,319	14.4	454,164

¹ Includes pack from the United States catch landed in Puerto Rico.² Includes tuna canned in America Samoa.³ Record.

TABLE X.—SUPPLY OF SHRIMP 1957-67

[Thousands of pounds]

	U.S. Catch			Imports			Total Heads-off
	Heads-on	Heads-off	Percent of total	Import weight	Heads-off	Percent of total	
1957	203,882	121,358	64	69,676	69,676	36	191,034
1958	218,842	127,287	60	85,394	85,394	40	212,681
1959	240,182	142,965	56	106,555	111,704	44	254,669
1960	249,452	148,483	55	113,418	119,139	45	267,623
1961	174,580	103,865	44	126,268	134,564	56	238,429
1962	191,105	119,154	44	141,183	132,504	56	271,658
1963	240,478	150,737	47	151,530	167,344	53	318,081
1964	211,821	133,113	44	154,577	169,510	56	302,623
1965	243,645	152,346	46	162,942	178,955	56	331,301
1966	239,046	148,255	43	178,549	194,946	51	343,261
1967	² 312,200	² 192,000	49	² 186,073	² 266,639	51	² 394,681

¹ Imports for 1957 and 1958 were considered to consist entirely of heads-off shrimp. Those for the following years were converted to heads-off weight on the basis of available data on the actual conditions of the imports.² Record.

TABLE XI.—SUPPLY OF FISHMEAL AND SOLUBLES, 1957-67

Year	U.S. production ¹		Imports		Total, tons
	Tons	Percent	Tons	Percent	
1957.....	325, 221	79.0	86, 414	21.0	411, 635
1958.....	313, 228	74.3	108, 167	25.7	421, 395
1959.....	² 389, 231	72.5	147, 392	27.5	536, 623
1960.....	339, 601	71.8	133, 349	28.2	472, 950
1961.....	367, 392	62.3	221, 923	37.7	589, 315
1962.....	374, 583	59.4	256, 320	40.6	630, 903
1963.....	309, 608	44.9	380, 132	55.1	689, 740
1964.....	281, 900	38.9	443, 154	61.1	725, 054
1965.....	301, 471	52.2	275, 804	47.8	577, 275
1966.....	265, 541	37.0	452, 091	63.0	717, 632
1967.....	248, 842	27.5	² 655, 155	72.5	² 903, 997

¹ Includes homogenized condensed fish for 1957-63.² Record.

Note: Wet weight of solubles and homogenized condensed fish have been converted to dry weight by reducing their poundage $\frac{1}{2}$.

TABLE XII.—SHELF AND SLOPE AREA ADJACENT TO VARIOUS REGIONS AND FORECASTED YIELD POTENTIALS (ALL VALUES IN THOUSANDS)

Region	area (N.M.)	Slope area (N.M.)	Demersal/fishes(T)	Shellfish (tons)	Pelagic (tons)	Demersal CSA	Pelagic CSA
New England.....	77.6	22.5	1,200	-----	1,000	15.5	12.9
Middle and South Atlantic.....	79.0	143.0	+1,400	+1,740	+1,440	17.7	18.2
Gulf of Mexico.....	112.0	45.0	2,500	1,900	4,160	22.3	37.1
Eastern Bering Sea.....	145.0	14.0	1,500	1,200	750	10.3	5.2
Gulf of Alaska.....	60.0	15.0	450	1,250	750	7.5	12.5
Transitional.....	27.9	12.2	400	(²)	400	14.3	14.3
California.....	23.0	5.6	300	(²)	1,500	13.0	65.2
Hawaii.....	3.9	4.3	(²)	(²)	(²)	-----	-----
Total.....	528.4	261.6	8,540	4,090	10,000	16.2	18.9

¹ Crustaceans only.² Unknown.

THE OCEAN REGIME OF THE REAL WORLD

(By Wilbert McLeod Chapman, Ralston Purina Co.)

This Panel deals with the National Interest in the Ocean. Except for a narrow rim around its edges the ocean is international and free for use by all nations, subject to international law. Accordingly the nature of this international milieu will affect materially, if not determine, the accomplishment of the National interest in the ocean.

It will be my purpose to examine some of the more widely mooted points said to require change in the governance of the use of the ocean in the light of new developments in the application of science and technology to the ocean's use, and in the light of the international political and juridical structure in which those applications are taking place, and will take place, in the near term.

Public speculation on these questions has been rife in the past few years. It will not be my purpose to trace in any detail the origins of this speculation, nor the activities of its promoters (although that would be a fascinating subject for a thesis in Political Science). I will only indicate some of the highlights along the recent trail for purposes of orientation.

In 1965 there was a White House Conference on the subject (1). In 1966 the 17th Report of the Commission to Study the Organization of Peace treated the issue of the sea-bed in considerable detail (2). In 1967 Arvid Pardo, Ambassador of Malta to the United Nations, made far reaching proposals on this subject to the First Committee of the General Assembly (3) which led, in course, to the establishment by the General Assembly of an Ad Hoc Committee to Study the Peaceful Uses of the Seabed and the Ocean Floor beyond the Limits of National Jurisdiction (4). In 1968 U.S. Senator Claiborne Pell proposed before the United States Senate a "Treaty on Principles Governing the Activities of States in the

Exploration and Exploitation of Ocean Space" (5). Later in the same year the United Nations Committee of the World Peace through Law Center published a study, incorporating a "Proposed Treaty Governing the Exploration and Use of the Ocean Bed" (6). This will be referred to herein as the Danzig Treaty, after the Chairman of the Drafting Committee which produced it. In October, 1968, there was published by the Center for the Study of Democratic Institutions, under the authorship of Elisabeth Mann Borgese, a study (The Ocean Regime) (7) incorporating a third form of such a treaty "Draft Statute of the International Regime for the Peaceful Uses of the High Seas and the Seabed beyond the Limits of National Jurisdiction". In January 1969 Senator Pell filed a revision of his former draft treaty in the U.S. Senate (8). In March, 1969, there was published "Our Nation and the Sea," Report of the U.S. Commission on Marine Science, Engineering and Resources, which contained recommendations on this subject (9). This has been followed by the publication of three volumes of Panel Reports (10). For brevity I will refer to these as the Auerbach recommendations, recognizing them to be the joint efforts of a good many people pulled together and made coherent by Professor Auerbach. Also in March, 1969 was published the 19th Report of the Commission to Study the Organization of Peace entitled "The United Nations and the Bed of the Sea" in which are incorporated far-reaching recommendations on this subject to the General Assembly of the United Nations (11).

During these few years a very large literature on this subject has arisen which I will make no attempt to review. I have pointed out the above actions as examples from the work of a relatively small but vigorous group of individuals, and private and public organizations, who seek to change international law and the organization of international affairs for a variety of purposes and are employing the use of the ocean as a vehicle for seeking this accomplishment. It will be my purpose only to discuss some of the main points that have arisen in the ensuing debates.

1. *Lack of Regime for the Deep-Sea Bed.*—It is often implied, and sometimes stated, that there exists no regime of law to cover the exploitation of the minerals and other resources of the deep-sea bed. This, of course, is untrue. There has been, as yet, no general division for juridical purposes in international law between the water column of the high seas, the air column above it, and the solid earth column below it. They remain maritime expanses that appertain to no one.

The high seas means all parts of the sea that are not included in the territorial sea or in the internal waters of a State (Convention on the High Seas, Article 1) (12). The high seas are open to all nations, both coastal and non-coastal, and no State may validly purport to subject any part of them to its sovereignty (Article 2). Freedom to use the high seas under rules of international law shall be exercised by all States with reasonable regard to the interests of other States in *their* exercise of the freedom of the high seas. (Article 2).

To be specific, there is no reason why the United States cannot license a firm to mine anything on the deep sea bed anywhere under existing international law in the same manner that it licenses vessels wearing its flag specifically to engage in the mackerel trade. By such a license it can regulate the activity of that firm in those operations in any manner that accords with its municipal law, as it does the vessels of others of its firms licensed to do various other things on the high seas. It can do this without purporting, or implying, any claim to sovereignty or jurisdiction over the nationals of other States similarly engaged in the same geographic area.

Similarly, the United States can license any firm within its jurisdiction to mine in this fashion within a particular geographic area, by particular means, by particular amounts, by particular time intervals, etc. With respect to firms within its jurisdiction it can grant these rights exclusively to it, or partially to several such firms, or allocate general rights to all such firms, as it chooses. It can assess whatever charges against such firms it chooses to do, and it can allocate funds so received entirely to its own treasury, or to the United Nations, or to a particular fund for the underprivileged, or for other purposes.

The problem is not in international law. If any exists it is in the absence of specific legislation in the United States Code, and this is subject to rectification by the United States Congress.

What I have said with respect to the United States, of course, is true of other nations.

2. *Disputes over the Use of Deep-Sea Bed Resources.*—Disputes over the use of Deep-Sea Bed resources falling within the purview of international law arise

between sovereigns, not among their citizens or between the citizens of one sovereign and another sovereign. While citizens and firms are frequently the objects of international law, only sovereigns are its subjects. The citizen on the high seas operates under rights pertaining to the sovereign whose flag he wears, not under rights pertaining to him as an individual under international law.

There is a wide range of procedures available for the peaceful settlement of such disputes among sovereigns (13) and they are in use steadily in the practice of nations.

The normal way to settle such disputes is by ordinary diplomatic communication. Not infrequently this leads to an agreement between the sovereigns to limit the activities of their citizens on the high seas in a manner that is mutually agreeable, and eliminates the dispute. This may be an agreement for a short period of time, say a year, open to renegotiation at the end of that time. There are a number of such agreements which have worked well over a considerable span of years. The agreement may last for a stated period of years, and many such agreements provide for an international commission appointed as among the nations party to the agreement to attend to these affairs, jointly, in the interim, within terms laid down by the convention establishing it. By such agreement the allocation of the use of particular resources as between the citizens of the nations party to the agreement can be, and sometimes is, made. (14).

Other procedures include arbitration or referral to the International Court of Justice. Admittedly there can be situations arise where the interests of sovereigns are so incompatible that there is a refusal to reach agreement through these normal peaceful channels, or that it takes a number of years of intensive dispute before this is done. An example is provided by the dispute among the United States; Ecuador, Peru and Chile over the claim by the latter three to exclusive jurisdiction over the sea, the seabed, and their resources to a minimum distance of 200 marine miles from shore. The three claiming countries have repeatedly refused to join the United States in taking the case to the International Court of Justice (15). Peru and Ecuador from time to time seize a United States vessel under this claim. United States vessels have continued to operate in the disputed area. The United States has attempted to protect its citizen in exercising its rights in the disputed area not only by vigorous diplomatic activity but by general legislation designed to mitigate the economic effects on its vessels of seizure or molestation on the high seas under claims not recognized by the United States.

It needs to be pointed out that the Pell, Danzig, Borghese, or other proposed draft treaties alluded to above, will not prevent or solve disputes of this nature. Treaties are not binding upon sovereigns under international law unless accepted by the particular sovereign. The International Court of Justice has recently once more laid out the limitations of such conventional law in its decision on the North Sea case involving Netherlands, Federal Republic of Germany, and Denmark (16). The International Court of Justice does not have jurisdiction in such cases unless the particular sovereign has accepted its jurisdiction generally or will stipulate this for the particular case. The General Assembly of the United Nations cannot enact legislation (no matter what it is called) which is binding upon sovereigns unless the sovereign in question agrees that it is.

3. *The Outer Edge of the Continental Shelf.*—A driving worry expressed repeatedly by the proponents of change noted above, is that there was going to be a mad "Colonial" scramble by the nations of the world to extend their sovereignty out over the sea-bed in order to obtain exclusive jurisdiction over the rich resources lying there. This fear was successfully inserted in a speech by President Johnson (17). What needed to be done rather quickly to stop this, they felt, was to prohibit expropriation of the sea-bed. To do this it was necessary to define what the present bounds of sovereign territoriality were so that what lay beyond national jurisdiction could be defined. This demanded a more precise definition of the outer boundary of the continental shelf.

There are several points in this complex idea that need to be dealt with. They include:

(a) As set out clearly by the International Court of Justice in its recent decision in the North Sea Cases, the Continental Shelf of a nation constitutes a natural prolongation of its land territory in and under the sea *ipso facto* and *ab initio*. It is so by inherent right. It is exclusive. It cannot be disposed of by others to others except by agreement of the sovereign.

(b) The doctrine of the continental shelf is a recent instance of encroachment on maritime expanses which, during the greater part of history, appertained to no one. The principle is applied that the land dominates the sea.

The doctrine arose only since the Truman Proclamation of September, 1945. It follows that where the land no longer dominates the sea, the continental shelf ends and beyond are maritime expanses appertaining to no one. No nation may validly purport to subject any part of them to its sovereignty.

(c) Boundaries of nations do not require precise definition and often, even as to land boundaries, are not precisely defined for long periods of time. This does not detract from their existence.

(d) Neither the Conference of Plenipotentiaries which negotiated the Convention on the Continental Shelf in 1958, nor the International Law Commission which in 1956 drafted the concepts generally included therein (18), felt that either the practice of nations, knowledge of the resources and structure of the continental shelf, or methodology of profitable extraction of such resources was sufficiently clear to permit a useful definition of an outer boundary to the continental shelf that would be agreeable to the nations that was any more precise than "the adjacent land to the depth of 200 meters or beyond that to where the depth of the superjacent waters admits of the harvesting of the natural resources of the said areas."

Knowledge of the seabed has advanced spectacularly in the ensuing decade and this is one of the most rapidly advancing fields of ocean research, but it is still highly fragmentary as respects the location of seabed resources that can be practically exploited. There is still no economic extraction of resources from the seabed where the depth of the water is much greater than 200 meters, and technology is not advancing those depths rapidly (this will be alluded to further below). As noted by the International Court of Justice in its decision on the North Sea Cases, the practice of nations in this field has not crystallized further than it was in 1958 to any marked degree.

Accordingly there does not appear to be any strong reason in current human activity respecting the seabed that did not exist in 1958 which requires, or makes beneficial, any more precise definition of the outer boundary to the continental shelf than was given in 1958.

There is no mad rush to colonize the deep-seabed. The claims in Latin America occurred before 1958, and are no more valid now than when made (19). As noted above, the International Court of Justice states that such rights as each nation holds in its continental shelf are inherent to it and do not require to be asserted by it to be valid. The obverse is equally true.

4. *The Wealth of the Seabed*.—As normally happens with hoaxes if you have the forbearance and strength to wait out their original thrust, the stories of the billions of dollars of wealth to be had each year in the reasonably near future from the seabed outside national jurisdiction are now bouncing back to haunt the tellers as unbiased economists and experts bring in their testimony and this is evaluated by competent bodies, including the Economic and Technical Subcommittee of the General Assembly Committee to Study the Peaceful Uses of the Seabed and the Ocean Floor beyond the Limits of National Jurisdiction.

The truth is that there are no billions of dollars worth of annual profit (excess of value over cost) to be had from the very deep-seabed.

There are great quantities of manganese nodules on the deep-seabed that contain other metals as well, such as cobalt, nickel, etc. There is no technology presently available by which they can be economically harvested and their component metals refined to sell in the market against the same metals from land deposits (20). This applies so far even to shallow, large deposits discovered in the Great Lakes area and the substantial deposits rather well known in moderate depths on the Blake Plateau. The one company actively working on developing the technology is investing some millions of dollars in doing so and does not anticipate the technology will be ready for full scale testing before the mid-1970's. Neither it nor any other company is presently planning actual seabed mining activities for manganese nodules, although work is going on by several entities to delimit and classify deposits against the day the technology and markets are ready.

In view of the massive geographic scale on which these nodules appear to be distributed, the major amount of capital that will be required to mine them when the technology is available, and the abundance of land sources of the metals, there is no evidence whatever that disputes among nations arising from conflicts between their citizens while mining the seabed for manganese nodules beyond national jurisdiction will perturb the international scene to a detectable degree within the lifetime of those worried about this problem.

It is quite likely that there are petroleum deposits at several points under the deep seabed, such as the Sigsbee Knolls of the Gulf of Mexico, north of the Cape

Verde Islands, in the Mediterranean, etc. But it is well known that there are extensive such deposits on the continental shelf in many parts of the world in much shallower waters that are cheaper to get at, and as geological exploration goes on there is continuous location of new deposits. The problem is not finding oil and gas, it is getting it out of the ground and to market at costs competitive with other sources of energy. Practical recovery from the continental shelf is now not going on much where the depth of water is greater than 400 feet. Everybody agrees that to be continental shelf, and within national jurisdiction. Costs go up sharply as depth of water increases beyond that, and technology is just as hard and actively at work lowering the cost per unit of extraction from tar-sands and oil-shales, shipping to market from land sources in the arctic, and in developing the generation of competitive energy from nuclear sources, as it is in getting petroleum out cheaper from under deeper water (21).

If there is any one thing illustrated by the debates in the General Assembly on this subject over the past couple of years, it is that neither developing nor industrialized countries (with the possible exception of the United States) have the slightest intention of allocating to the United Nations or any other entity any resources of the seabed which may be inherently its own either under customary international law as interpreted by the International Court of Justice, or by interpretation of the Convention on the Continental Shelf (22). Petroleum deposits on continental shelves now appear to be sufficiently more ubiquitous than they did in 1958, or even 1967, that the nations which may have workable deposits in reasonable depths off shore appear to be more numerous than those who do not.

Other minerals resources such as diamonds, phosphorite nodules, tin, gold, platinum, and other heavy metals, as well as practicably extractive sand and gravel, all appear to be quite exclusively things of the continental shelf even as narrowly defined, and therefore subject to national jurisdiction.

Thus six billion dollars per year revenue for the poor of the world and the support of international government free from strings imposed by national governments appeared suddenly in the oratory at the United Nations in the fall of 1967, but by the spring of 1969 it had disappeared without a shovel being turned or a dollar emerging. This is about the length of time required to explode the South Sea Bubble of the previous century. Some technologies do not advance as rapidly as others.

5. *Increasing the Use of Marine Resources.*—It is one of the frequently advanced reasons for need to radically revise the governance of the use of the sea that the disposal of social surplus in the world between the rich and the poor needs to be done in a more equitable manner. No reasonable person doubts the validity of that thesis. It has been the prime social and economic problem of world society since the cultivation of two-eared wheat began in the Middle East perhaps ten thousand years ago. It is only the relevance of the use of marine resources to this thesis that is questionable.

The reason why marine resources are not more used than they are at present is primarily because competitive products can be obtained from land sources and got to market cheaper. The obverse of that statement is that if marine resources are to be used to a greater extent than at present the cost of getting them out of the ocean, processing for marketing, and distributing them to market must be made cheaper. This applies equally to fish and shellfish, manganese nodules, phosphate nodules, petroleum, tin, gold, diamonds and platinum (as well as sand and gravel).

The people (or organizations) who perpetrated the hoax on Ambassador Pardo that there would soon be six billion dollars of new revenue available per year with which to support the United Nations, or to divide out among the developing nations, or to fill other good purposes, could not have been so economically naive as to have believed any such nonsense, and their motives are not clear to me. By their activity they have damaged the support of much good work by United Nations specialized agencies that has been aimed productively at assisting the developing nations to a greater use of the ocean. I refer to the work of the United Nations Development Program, FAO, UNESCO, WMO, ECOSOC, ECAFE, IBRD, Asian Development Bank, African Development Bank, etc. (23). The reason they have damaged this support is that there is a sufficiently strong reaction against their fanciful schemes to internationalize the ocean in the name of the United Nations or a new international body that these other quite useful, and in some cases long standing, activities of the United Nations agencies are beginning to be seen in national legislatures (whence originate all funds supporting the United Nations and its specialized agencies) as a sinister plot by internationalists to destroy the foundation of sovereign national government.

This does not sit much better with socialist than with capitalist, or mixed, national governments and casts an added aura of doubt about the United Nations and its bodies, which was not needed.

The Pell Treaty calls for the establishment of a Licensing Authority; the Danzig Treaty, for a Specialized Agency, Authority, or Ocean Agency; the Borghese Treaty for an elaborate Ocean Government of Executive, Legislative, and Judicial Character; the Eichelberger (Commission to Study the Organization of Peace) recommendations include the establishment of an International Authority for the Sea; the Auerbach recommendations include those for an International Registry and an International Fund. Each contemplates a considerable new machinery of government in the international field, not to grow with need out of established international machinery, but as new creations to perform new duties not now being carried out.

None of these persons or organizations appear to have attempted to calculate the amount of new money that will be needed to run the new machinery. They have rather naively assumed that it will come from the normal national sources now supporting international activities, or from the sea by taxing newly the use of the resources of the sea.

If it is going to come out of national treasuries by traditional means it appears obvious that other useful activities of the United Nations will require to be curtailed, because national legislative bodies in all parts of the world are becoming increasingly reluctant to provide added funds to the United Nations and its specialized agencies.

If it is going to come as new revenue from taxes on new ocean-based industry two things may be said:

(a) These will be taxes on the operations of national companies which will not come into national treasuries, and the number of nations who are likely to vote for such a thing in the General Assembly are not many; and

(b) These will be added financial burdens on new industry in the ocean, further decreasing its competitive ability against land industry, and thus delaying further the initiation of new use of ocean resources.

Because of the presumed (but not evident) great mineral wealth of the seabed all of these schemes are aimed first, and most heavily, at mineral wealth, but all of them either directly or indirectly assume functions respecting living resources. The difficulties that would arise from such new taxation schemes can be summarized as follows:

(a) Petroleum resources have been, to date, the spectacular providers of new income from the sea to governments, chiefly arising from bids for rights to drill on the United States Continental Shelf. Practical extraction of oil from the seabed is now limited to somewhat less than water depths of 200 meters. Drilling and extraction under greater depths is technologically feasible now, but not economically feasible. The economics of the oil industry are too complex for an outsider to fathom, but the fact that production is not moving deeper backs up the statements by oil people that not only have economic levels been reached, but that the oil companies presently using seabed resources have not got that production, even, to a profitable level.

The people who informed Ambassador Pardo about the billions of dollars of profit available for picking up on the seabed appear to have reasoned from this syllogism: The United States has collected a few billion dollars from its petroleum people for rights to drill on its continental shelf; there is petroleum and other resources beyond the 200 meter isobath or 50 mile from land (whichever is greater) limit; therefore the revenue which an international agency could collect for rights to drill or mine out beyond that limit could run into many billions of dollars per year net profit.

This syllogism conveniently overlooks some vital facts, among which are:

1. The United States petroleum business is protected by tax allowances and quota provisions in this enormous market to the extent that crude sells here for about twice the world price (roughly \$3.00 versus \$1.50 per barrel). This enables it to pay the United States Government these phenomenal costs for the right to drill on its Outer Continental Shelf. These screw-ball economics do not obtain for other petroleum production outside the U.S. customs area, and are not necessarily a permanent condition here (24).

2. The cost of drilling production wells for petroleum goes up exponentially with depth of water (25) and that is why production lags so far behind exploration as to water depth. New technology presently in sight, but not yet applied, does not mitigate this problem much. Cost goes up with depth of water. At the

same time technology in the recovery of petroleum from oil-shales and tar-sands advances in the direction of bringing cost per unit of production down on that source.

Additionally the technology and economics of producing energy more cheaply from nuclear fuels moves forward slowly but steadily and massively.

3. It is impractical to exploit oil off the coast of a country without having the permission and good will of that country, no matter what the legal situation is. The main cause is not the fear of harassment but is the necessity for logistic support. An oil firm company can afford to pay to one governmental body for permission to operate, but not to two (25).

4. Whether one considers the Convention on the Continental Shelf, or the decision of the International Court of Justice in the North Sea Cases, or the report of the National Petroleum Council, or the report of the National Marine Commission, or the proposals referred to herein as the Pell Danzig Borghese, Auerbach, and Eichelberger recommendations, the continental shelves of most countries in the world are now terminated at a depth more or less greater than 200 meters. Thus the economics of producing oil from the sea floor has to improve enough to at least double the depth from which recovery is possible before a problem will arise under the narrowest width of the shelf presently contemplated. This looks to be a long time off. Even then the nations can license their own firms to operate beyond their national jurisdiction under existing international law.

5. A scanning of the General Assembly debates does not indicate a willingness of nations who have the possibility of petroleum deposits near their coasts on the shelf, as broadly defined by the National Petroleum Council, to turn over their putative rights to any international body. Such nations would appear to make up a majority of United Nations members, or very close thereto, which makes the possibility of General Assembly action ratifying such a policy unlikely. If the General Assembly did take such action it would not apply to an unwilling sovereign. Thus the amount of revenue such an international body could expect from such sources in the foreseeable future would certainly be far short of its own costs of operation, let alone any excess to devote to good works. The syllogism stated above appears to have no basis of reality.

6. In the reports of the prophets of change referred to above much is made of the phrases "use of their resources in the interest of mankind" for the benefit and interest of all mankind", and "the common heritage of mankind". While these are what are called "O.K." words in the argot of the day, what they have meant heretofore in international law is that resources of the high seas belong to him who first reduces them to his possession, and they were the common heritage of mankind in the sense that anyone competent to harvest them was free to do so within the usages of international law and the practice of nations.

7. Harvestable phosphate nodules, heavy metals, sand and gravel, diamonds, etc., are, so far as known, on the continental shelf within national jurisdiction and not available for international revenue raising without the consent of the sovereign. Even at present it is not economical to harvest many of these shallow water resources. To put added taxes on deeper deposits which may be outside national jurisdiction (and at present unlocated) would delay further the beginning of their harvesting. No revenue is in sight from these sources for an international agency.

8. Manganese nodules, and the economics of harvesting and marketing their components, have been studied intensively and recently. Everyone concerned agrees that with existing technology these cannot be harvested profitably. They are clearly abundant beyond the limits of national sovereignty. To add new revenue raising burdens to their harvesting will clearly slow down further the beginning of their harvest.

9. Living Resources are the most valuable present crop had from the ocean and, in fact, the annual crop of them is valued higher than that of all other resources presently harvested from the ocean put together (including petroleum from the continental shelf). (26). Furthermore they are harvested broadly outside the limits of national sovereignty.

The current efforts of national governments and international agencies in respect of living resources harvest from the ocean are uniformly directed toward lowering the cost per unit of production of fish and shellfish from the ocean, and substantial governmental funds (at least a half billion dollars per year in toto) are used for this purpose. The reason is to increase the yield of protein food from the sea. The means used are research to provide conservation, to explore for new resources, to perfect technology, and quite frequently to subsidize fishermen to in-

crease their ability to harvest. This results in an increase in production of from 6% to 8% per year. Resources are available to permit a substantial annual yield of food from the sea somewhere between 4 and 40 times present levels (27), (28). The difference between 4 and 40 is chiefly in economic estimates and not in natural history estimates.

The need for animal protein in the world is such that the nations are not going to reverse their present activities in this direction by permitting a raising of costs of production to support a new machinery of government which will be of doubtful utility.

One could go on criticizing the suggestions of Pell, Danzig, Borghese, Eichelberger, Auerbach and their associates in a negative manner for some time and in considerable detail. Their proposals invite such extensive negative criticism because they are not built on the real and extensive practice of nations in these matters, and the substantial progress in the increased use of the sea being made along these lines. To legislate for space, or for Antarctica, where there is not much history of human activity, or many resources available for use, is one thing; to revolutionize the governance of the ocean where there has been a long history of human utilization, and where there are many additional resources for use, is another. To revolutionize the relationship of nations among themselves, and to support the substitution of international government for international cooperation among national governments on the sole excuse that better governance is needed for the ocean is patently impossible. The reed is too slender to support so large a bloom.

Yet everybody dealing seriously with the ocean realizes that there is need for much additional international cooperation respecting the use of the ocean, and a steady improvement in the governance of that use as it grows more intensive. Accordingly I propose to discuss a few of the main problems that exist in the real world and suggest some approaches to their solution. There will be no surprises by way of suggested solutions.

1. *Freedom of Commerce.*—The key problem respecting the ocean is to keep free the flow of commerce among nations over, through and on the ocean so that this can be exercised by all nations with reasonable regard to the interests of other nations in *their* exercise of the freedom of the seas.

Few, if any, nations are entirely self-supporting within their boundaries and those who are nearest to being so self-supporting are among the poorest. The very real hope that now exists in the world for the extinction of poverty and the liberal provision of needs and desires for existence to all is dependent absolutely upon the flow of ocean commerce. Land trade routes are not able to handle the level of commerce among nations required to support the present human population of the world at present economic levels, much less larger human populations at improved social and economic levels. To the extent that ocean commerce is retarded or prevented from growth, the economic situation of the human population will be degraded, or the population will require to shrink, or both (depending upon the severity of interference with commerce).

2. *International Straits and Narrows.*—The key problem in keeping ocean commerce open is at the choke points where the land narrows the sea-passage. Under the three-mile rule for the territorial sea the present channels of commerce grew. Under a 12-mile rule for the territorial sea many of these straits and passages disappear as channels of traffic of an international character and come under national sovereignty. Under a 50 mile rule for the territorial sea most international straits would disappear. Under a 200 mile rule for the territorial sea the major existing channels of sea commerce would mostly pass through territorial waters at some point or another.

Although customary international law permits of the innocent passage of ocean commerce through the territorial sea, the granting of that privilege by a sovereign is a quite different thing in practice than a sovereign exercising a right pertaining to him under international law. The temptation of the sovereign owning the territory through which a trade channel passes is to interfere with that passage to his own advantage (30). This has been evidenced repeatedly through history. Also the situation in times of war changes the power of both the belligerent and non-belligerent sovereign, under customary international law, materially.

To the extent that the territorial sea is broadened the free flow of commerce among nations, over, under, and on the sea is threatened.

The real problem here, however, is that the 1958 Convention did not clearly provide for warships and military aircraft to transit in innocent passage inter-

national straits or those that had formerly been international. A new lot of naval strategists wish to reopen the law of the sea again to attend to this. They haven't got enough votes on their side to elect a dog-catcher, much less get such a measure adopted by a two-thirds majority of a new conference of plenipotentiaries on the Law of the Sea. By the time they will have found this out, in mid-conference, we will all be worse off than if they had not brought up the subject.

3. *Marginal Seas*.—Another part of this sea commerce problem is the attempt by Russia to limit the full international character of marginal seas (31). The attempt is in progress with respect to the Barents Sea, the White Sea, the Baltic Sea, the Chuckchee Sea, the Okhotsk Sea, the Black Sea, and presumably eventually with the Yellow Sea, East China Sea, South China Sea, Red Sea, and Mediterranean. The Canadian desire in respect of the Gulf of St. Lawrence, Hudson's Bay, and the Northwest Passages are not comforting on this aspect. The Indonesian and Phillipino contentions in respect of the Archipelago envelope theory are also still around.

4. *The Flow of Military Power*.—It is nasty to talk about military power because, like some other necessary human activities, this is supposed to be treated of in private. The difficulty is that free commerce on, over, and under the sea has never existed in the absence of military power to enforce that freedom, in the same way that freedom to peacefully use the streets of cities, and the highways of land, has never existed for any considerable period of time in any particular place in the absence of police force. We all hope, and believe, that the millenium has come with the United Nations charter and that this is all dead history. There is nothing in the practice of nations, or of human being generally, since 1945 that gives any credence whatever to such optimism.

Military force is national. International military force is inconsequential and could not fight its way out of a paper bag. There is no reason to think that situation will improve. It has actually degraded in the past decade. Unless military force pledged to protect international law can flow where commerce flows, commerce is unlikely to flow there indefinitely. Broadening the territorial sea, making international straits and narrows into national straits and narrows, and modifying the international character of marginal seas are all measures directed toward limiting first the flow of military power, and only secondarily the flow of commerce. But the two are inseparable, and the latter cannot long exist without the former.

5. *Military Security*.—A major selling point of the people interested in revolutionary change in the Law of the Sea has been the desire to demilitarize the ocean. It has very large public appeal because everybody wishes to decrease the possibility of war, and the arms budget. The net effect of this gambit to date, however, has been only to give the Russians a small public relations ploy to make in the 18 Nation Disarmament Group.

It is well known that a major factor in the present strategic balance of power in the world is the opacity of the ocean to most of the electro-magnetic wave spectrum and the short-term defense advantage this has given the United States, with its nuclear powered submarines equipped with ICBM missiles. It is equally well known that the United States has been long employed in improving its capability to make transparent the ocean, particularly in the audible range of the spectrum. The first steps in this process, as is well known, has been the deployment of listening devices broadly over the deep-seabed as well as over the continental shelf (32). Other steps are in progress.

It would be ridiculously foolish for the United States to terminate or lessen this effort to eliminate the hiding capability of weapons systems within the ocean, and no sensible person or nation in favor of maintaining world order is in favor of it.

Aside from this opacity feature of the ocean, and some slight additional pollution risk, the use of the continental shelf and the deep seabed for the deployment of weapons systems is no more wicked than their deployment elsewhere. The purpose of weapons systems, whether on the seabed, in the ocean, on the ocean, on land, in the atmosphere, or in space is to kill people and destroy property to the net advantage of the possessor of the weapons system. Where it is deployed is not of much consequence to the peace of the world unless it is in the hands of a possessor wishing to change world order by force and gives him sufficient advantage to lure him into the attempt.

All of this is appropriately a part of the general disarmament problem, and the general world peace-keeping problem, so intimately that it cannot be dealt with practically and separately therefrom as an ocean problem.

6. *Living Resources Competition*.—Most of the actual, as contrasted with the fanciful or future, interaction among nations over the use of the ocean arises from friction among them and their citizens over the harvesting of living resources from the sea. This has been the case for the past three hundred years and more, and is likely to be for the next three hundred years.

The old and long term problem initiating fishery disputes is competition for the use of the resource in the high seas. No general formula has been capable of being devised yet to settle this major cause of friction among nations and it is unlikely that one will be so long as human beings remain what they are and are governed by human sovereigns. The basic causes are cupidity, mistrust, and jealousy. The lack of general formulation to solve this problem is not for lack of trying. More diplomatic effort has been put into the attempt over the years than into most international activities. No such formula could be devised at the 1958 and 1960 conferences on the Law of the Sea, for instance, and in the end the success of those two conferences turned on that aspect.

The only satisfactory way to settle a fishery dispute of this nature is for the nations whose citizens are involved to negotiate out an agreement, or agree to have this done for them by an arbitral tribunal or the International Court of Justice. All of these systems have been successfully employed in the recent past. The numerous fishery agreements (33) negotiated annually or frequently among Russia, United States, Canada, Poland, Japan, Australia, Norway, Iceland, England, etc., in different combinations, are proof that the system is a useful one, as are the several major arbitrations of the 19th century, and the Anglo-Norwegian Fishery Case before the International Court of Justice after World War II.

As an example of why this works the following anecdote is related. I met a Russian colleague of mine in Rome a year or so ago and congratulated him on the successful negotiations recently completed between U.S.S.R. and U.S.A. over the fishery for king crab in the Northeast Pacific Ocean. He smiled wryly, and said as follows:

"Before leaving for Washington the Russian delegation was called in to be personally instructed by Mr. Kosygin. Mr. Kosygin said he wanted us to understand that if and when Russia went to war with the United States it would not be over crabs".

Until sovereign national governments, or the high seas, are done away with there is unlikely to be any way to prevent disputes among them over fisheries lying in the high seas. The disputes will require to be settled by peaceful means or by force.

7. *Living Resource Conservation*.—The Conservation of Living Resources is a different matter. It is agreed among the nations that "conservation of the living resources of the high seas" means the aggregate of the measures rendering possible the optimum sustainable yield from those resources so as to secure a maximum supply of food and other marine products; and that all nations have the duty to adopt, or to cooperate with other nations in adopting, such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas (33). That convention goes on to provide a suitable international mechanism for the settlement of disputes arising out of fishery conservation problems. It is in force. Furthermore its principles are in use even as among nations which for one reason or another have not yet ratified it (as for instance the Russian-Japanese fishery arrangements in the Northwest Pacific).

There is a wide variety among the twenty-three international fishery bodies and commissions currently dealing with fishery conservation problems in the world, and a body of experience in such matters extending over the past sixty years (34). I suggest that in this body of experience and practice are examples that will be more practically useful among nations dealing with joint problems arising from harvesting the minerals of the deep-seabed than in any formulation put forward in the Pell, Dantzig, Eichelberger, Borghese, and Auerbach papers.

SUMMARY

In my view the people who have seized upon the ocean as a vehicle for reforming the social, economic and diplomatic conduct of the human race have done, and are doing, great damage to the cause of improving the use of the ocean as a means for bettering mankind.

They have held forth, to the poor nations, and the uninformed, promises of great wealth from the ocean that does not exist. The expensive international

machinery they have proposed, if put in train, would use up more money than it would take in and this would be subtracted from the financial support of the good works now done by the United Nations and its family of specialized agencies.

They have held forth promises of peace and good will that would result from making militarily neutral the seabed while well knowing that in the arsenals of the world are weapons of several types stored in sufficient volume to wipe out the human race several times over, with delivery systems in the hands of more than one nation, and that sweeping the seabed clean would contribute inconsequentially to the balance of power, or the peace, of the world.

They have attempted by clumsy subterfuge, and quickly detected indirection, to substitute international government for international cooperation by sovereign national governments, and by so doing have set rich against poor, strong against weak, and developing against industrialized to the end that progress in achieving international cooperation among governments and peoples has been slowed down.

They have stated a lack of a regime for the deep-seabed when one fully suitable to present needs is available, and they have demanded an urgent definition for the outer boundary of the continental shelf more precise than the vague one deliberately adopted by the comity of nations in 1958, on the basis of rapidly deepening technological needs that do not exist.

With their alarms and excursions they have excited even more vividly the normal greed of the ignorant, and with their pseudo-science and existentialist economics have confused the national legislatures who provide the funds for international assistance and cooperation as to the difference between mutual assistance through international channels and international government, with the result that sources of funds for the former, always hard to get, are becoming even more difficult to extract from national budgets.

By their actions they have set back the International Decade of Ocean Exploration and the Long Range Expanded Program of Ocean Research by some years at best, and with it damaged seriously the possibility of actually making the ocean more useful to man until the confusion they have introduced about the ocean and its affairs can be washed away by the rising tide of desire by all to know and use the ocean more wisely.

If the amateurs, dilettantes and reformers who have fastened upon the ocean as a vehicle to make humans less human, and more saintly, could be caused to switch their attention from the ocean to the moon, or Mars, or Venus, or nearby space, the cost of the space program to both Russia and the United States would have been money well spent.

CONCLUSIONS

By way of conclusion I make the following recommendations for action by the United States Government:

1. *Hold fast to the contention that the breadth of the territorial sea is three miles.*—There is no better protection for small nations than freedom for their commerce to use the sea with the minimum possible interference from coastal or other nations, and this rule will prevail as they experience that truth (35). It was true when Thomas Jefferson, as the Secretary of State of a very weak and new nation, set it down in 1794. It was true when Elizabeth I, as the sovereign of a very small nation, which turned out not to be so weak, set it down nearly 200 years before that. (36). It will be even more true for small and weak nations a hundred years from now.

2. *Keep open international straits and marginal seas to the flow of peaceful commerce and the military force required to keep the flow free from unreasonable impedance.*—Tests of strength will be necessary from time to time to accomplish this as it was near Matsu Island, in the Gulf of Tonkin, and during the Cuban missile crisis. From time to time forbearance for a period of time may be the better part of valor, as in the attempted passage of U.S. Coast Guard vessels north of Russia, overflights past Ecuador and Peru, and the use of the Red Sea. But over the long run ocean trade routes must be kept open to preserve the peace, even if it takes war to do it, as it has in the past.

3. *Cease agitating for a precise definition to the outer boundary of the continental shelf.*—Agitation for a revision of the Convention on the Continental Shelf will, if successful, lead inevitably to another general Conference of Plenipotentiaries on the Law of the Sea. In the present unstable political situation of the world it is unlikely that decisions would be reached in this field as satisfac-

tory to United States general interest as existing customary and conventional international law. There is no need arising from new technology for a more precise definition to the outer boundary to the continental shelf that is more intense now than it was in 1958, and there is even less likelihood of a more satisfactory such boundary being agreed to than the one in the Convention on the Continental Shelf. Agitation for new boundaries for the continental shelf brings increased pressure on the breadth of the territorial sea, and the accompanying international straits and marginal seas problems.

4. *Adopt such domestic legislation as is required to permit the licensing of mining and well drilling by U.S. firms in the seabed beyond national sovereignty, and to implement the four conventions arising from the 1958 conference, to which the United States is a party.*—There is no reason why the United States should not take advantage of its, or any other, technology to mine the deep-seabed when that technology develops. There is no conflict likely to arise out of such mining in the foreseeable future that cannot be handled satisfactory by the same diplomatic methodology used repeatedly and successfully in the settlement of fishery disputes. There is no resource to be mined on the deep-seabed known of yet, the mining of which is retarded by lack of unique use rights to the resource in a particular geographic area. Statements to the contrary are reflective of a psychological attitude toward property ownership by businessmen accustomed to land operations, and their bankers, and not warranted by presently known conditions at sea.

5. *Move forward on a broad front in the scientific investigation of the atmosphere, the ocean, its boundaries and its contents by plowing important new money into this activity. This should involve at least \$100 million of new money on average per year for the next decade.*—The general plans for doing this have been set out by the National Academy of Sciences—National Academy of Engineering for the domestic phase (37), and by the Joint Working Party of ACMRR/SCOR/WMO for the international phase (38). What is needed now is new money.

6. *Strengthen the civilian establishment in the United States Executive by the creation of a body resembling the National Oceanic and Atmospheric Agency proposed by the National Marine Commission.*—Outside the United States Government it is generally agreed that this is the strongest step forward the United States could take in marine affairs. It is the several warring factions in the United States Executive, each of whom wants a bigger share of the ocean appropriation dollar, who oppose this action. (39)

7. *Strengthen the international establishment for ocean research and technology by supporting the action now afoot among the specialized agencies of the United Nations to build the Intergovernmental Oceanographic Commission into an ocean agency useful to all of them.*—Eventually there will need to be a World Oceanic Agency to handle the scientific and technological aspects of expanded use of the ocean. So long as the political agitation in the General Assembly, fomented heretofore by the United States, remains so strong the possibility of getting an international scientific and technology agency established in this field appears to be remote. The best interim alternate available that can be presently achieved appears to be the strengthening of the Intergovernmental Oceanographic Commission. (40).

8. *Strengthen with adequate funds and national support the World Weather Watch System and the Global Atmospheric Research Program of the World Meteorological Organization and the companion Integrated Global Ocean Station System and Global Ocean Research Program of the Intergovernmental Oceanographic Commission.*—In these cooperative international activities lies the possibility of understanding the air-sea environment adequately to materially improve the economic and social conditions of mankind as a whole. (41).

9. *Strengthen with adequate funds and national support the Department of Fisheries of the Food and Agricultural Organization of the United Nations and its Committee on Fisheries.*—These are the bodies through which assistance is actually (rather than fancifully) being given to the developing countries for improving their production of food from the sea, and through which the monitoring of the world ocean to see where overfishing problems may be developing, and the framing of means to prevent them, is actually going forward. (42).

10. *Broaden the role of the Office of the Special Assistant to the Secretary of State for Fisheries and Wildlife into an Office of Ocean Affairs in the Department of State.*—This is the office that actually has the successful experience over the years in negotiating agreements and treaties with other nations respecting ocean use, and the handling of such problems on the practical diplomatic level.

If these ten recommendations were followed through on vigorously by the United States Government we would be in a much better condition respecting the use of the sea than we are now, or than we would likely be if we plugged ahead promoting the concepts included in the Pell, Danzig, Borgese, Eichelberger, or Auerbach, approaches to the subject.

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39. The Directors General of FAO, UNESCO, and WMO entered into formal agreement late in 1968 to establish a joint interagency committee to ensure cooperation among their agencies through IOC.

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Mr. LENNON. The hearing will stand in recess until the call of the chair.

(Whereupon, at 11:45 a.m., the committee adjourned, to reconvene subject to the call of the Chair.)

NATIONAL OCEANOGRAPHIC PROGRAM

TUESDAY, OCTOBER 21, 1969

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:15 a.m., pursuant to call, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The committee will resume its hearings, and we are delighted and honored to have with us today Dr. Lee A. DuBridge, Director of the Office of Science and Technology of the Executive Office of the President.

Will you come forward, Doctor. We have your prepared statement. I assume everyone has it in front of him. Is it your intention, sir, to go through your statement, or summarize it and then put the statement into the record following your summarization of your statement? Which is your preference, sir?

STATEMENT OF DR. LEE A. DuBRIDGE, DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY, EXECUTIVE OFFICE OF THE PRESIDENT

Dr. DuBRIDGE. It is a fairly brief statement. I can go through it if you would like. If you would prefer, to save time I will summarize it.

Mr. LENNON. Do whatever you want to do.

Dr. DuBRIDGE. I will go through it briefly.

First let me say I am delighted to be here today to express my views particularly on the report of the Commission on Marine Science, Engineering, and Resources, and to present some general views on the marine sciences program.

I must express my admiration for the Stratton report, as it is called "Our Nation and the Sea," which the Commission submitted last January. Dr. Julius Stratton and several other members of the Commission are well known to me personally, and I have high regard for their abilities and opinions. The Commission has done a thoughtful and commendable job by bringing together in this one report an account of many of our problems and opportunities in the marine environment.

Anyone who has ever lived, as I have, in a coastal area cannot help but be moved by the vast mysteries of the ocean. Its role in our Nation's history is clear and its potential for resources, commerce, recreation, as well as its potential for degradation through pollution and unwise development concerns everyone.

In the discussions which have proceeded before this subcommittee, within the executive branch, and in the public press about the Commission proposals the question of Government reorganization has received a great deal of attention. I will therefore address myself to the question of organization, and return to some of the more important substantive programs later.

Needless to say, I am not an expert on Government organization and there are very few remarks I need to make on this subject. The Stratton report, as you know, proposes some quite sweeping changes in the organization of the Government in the areas of marine and atmospheric sciences through the creation of a new agency designated a National Oceanic and Atmospheric Agency (NOAA).

In this new agency it is proposed that many existing bureaus and activities scattered among various departments be coalesced into a single unit. Such a move would have a major impact on the departments concerned, and yet even so NOAA would not include all of the activities of Government encompassed within the area of the oceans and the atmosphere and especially would not include many of the problems and activities related to the earth's environment generally.

As you know, many proposals have been made by other individuals and groups for changes in the organization of Government to accomplish various purposes. President Nixon, recognizing the complexity of many of these proposals, has formed a Council on Executive Organization headed by the distinguished industrialist, Mr. Roy Ash. It would clearly be improper for a member of the administration to make specific proposals about NOAA until the Ash Council has completed its organization studies. The proposals relating to NOAA will be carefully considered by the Ash Council.

Mr. LENNON. Could I interject at that point?

Dr. DuBRIDGE. Yes.

Mr. LENNON. "The proposals relating to NOAA will be carefully considered by the Ash Council." The question is: When?

Dr. DuBRIDGE. I think they are at work on it now, sir.

Mr. LENNON. I won't comment on it further. I won't take your time. Go ahead.

Dr. DuBRIDGE. I can only say that it is very tempting when one considers any broad national problem to raise the question of whether a new Government agency or department should be created to deal with the problem. There are, of course, important precedents for such action.

One thinks immediately of the Atomic Energy Commission and the National Aeronautics and Space Administration which have done such an outstanding job in their respective areas. It should be pointed out, however, that these agencies do not necessarily constitute a precedent in other areas.

Atomic energy and space were wholly new areas of science and technology which at the time of their creation had not become the responsibility of other departments or agencies of Government. A brandnew area of human endeavor resulting from recent research and development stimulated each of these two independent agencies and they were created by the Congress in response to the very evident urgent national need for large-scale activities in these fields.

The subject of marine and atmospheric science and the general subject of environmental science and technology generally are not, however, brandnew areas of endeavor. There is a long history of national interest and activity in regard to the oceans and in regard to the weather and the atmosphere and with regard to other environmental matters.

Many departments and agencies of Government have naturally been assigned important responsibilities in these areas, some of which have been carried forward actively and effectively for many, many years. There are, in fact some 22 bureaus in 11 departments and agencies which now have responsibilities in the marine science effort, in each case the effort being closely related to the overall mission of the agencies or departments concerned.

It happens there are also 22 bureaus in nine departments and agencies engaged in water resource activities and 16 bureaus in 13 departments and agencies involved in atmospheric science.

At first sight this appears to be an undesirable fragmentation of effort, and consolidation of Federal efforts appears to be a very attractive goal. However, it must also be kept in mind that reorganization of agencies to consolidate activities related to one objective or area of endeavor may, at the same time, result in fragmenting activities that are concerned with another objective.

As just one example, the Department of Transportation would have no link to marine transportation without the Coast Guard. It is quite clear that there is no easy solution to the problems of Federal organization in the case of broad areas such as marine science, atmospheric science, or water resources.

I understand that the Stratton Commission, in its recommendations, sought to consolidate those activities that it regarded as not being integral to the basic mission of the departments and agencies from which they would be transferred.

It is not clear, however, whether this rationale does in fact extend to the recommendation for including the Coast Guard in the proposed new organization, and there are other examples. In any case, it must be recognized that the surgery which is required to extract bureaus and agencies from existing departments with long traditions of work in the field may constitute more disruption than coordination when one attempts to fit these agencies with different traditions and different purposes into a single unit.

I am reminded of the many suggestions which have been made that the government create a new Department of Science to coalesce all the multifarious activities of our Government in the science and engineering fields. I have opposed such a proposal, at least in any form so far suggested, since I think it is very proper that many agencies be concerned with scientific and engineering matters.

This is not to say that some reorganization of our efforts in marine science is not desirable, and I am sure that this matter will be given careful consideration by the Ash Council, and of course by the Congress.

I would only remark, finally, that even the NOAA proposal does not include all of the governmental work in either the oceans or the atmosphere, and of course it does not pretend to include many closely related problems of the environment and the relations between the

ocean and the atmosphere on the one hand and the solid earth on the other.

Thus, from one point of view NOAA is a radical proposal because of the disruptions it would cause within present Government structure, and at the same time it is too conservative a proposal in that it does not include many of the scientific and technological areas which are closely related to each other and to the marine and atmospheric problem generally.

However, let me turn now to the substantive proposals made by the Stratton Commission.

These proposals exhibit the thoroughness and care with which the Commission did its work. The report makes more than 100 programmatic recommendations covering all phases of marine science, resource development, and engineering. The Commission report and its supporting documents outline many of these programs in considerable detail.

We have tried, ever since the beginning of this administration, to review these many programmatic proposals with the care which they deserve. Agencies of the Federal Government have submitted comments, task forces set up under the Marine Science Council have commented on the Commission proposals and offered their own conclusions.

This review and evaluation is continuing. It is a tremendous subject. The expertise of the National Academy of Sciences and the National Academy of Engineering has been drawn on, as appropriate, to obtain further opinions.

Finally, we have attempted to set priorities and to pick out those items which will receive initial emphasis in the marine science and engineering areas. The President has made it clear on many occasions that he intends to move forward in the marine science field and we are now ready to take the first steps.

Before detailing these priority areas I would like to mention one unpleasant fact which I am sure will come as no great surprise to you gentlemen. The budget for the next year (fiscal year 1971) does not appear to permit many programs that we would like to institute to meet various needs and opportunities for our nation.

The many demands on Federal funds taken together with the President's desire to curb the present inflation have dictated more selectivity than we may have wished for. These are simple facts and not what any of us would like but they must be faced at the same time we seek to take advantage of our opportunities.

As just recently announced by the Vice President in his role as Chairman of the Marine Council, five areas have been selected for increased emphasis this year:

1. Increased efforts to assist States in planning for and managing rational development of the coastal zone and the Great Lakes;
2. Organization of coastal-zone research laboratories to contribute to the definition and solution of coastal-zone problems;
3. A pilot program to assemble, extend, and test our knowledge so that we may reverse the increasing pollution of our lakes, looking toward restoration of the Great Lakes;
4. Programs that would be a part of the U.S. contribution to an International Decade of Ocean Exploration; and

5. Expanded research on the Arctic environment.

In regard to No. 1, the coastal counties of the United States, including those counties bordering the Great Lakes, presently contain more than 40 percent of the Nation's population and less than 10 percent of the land area. We expect that this concentration of population in the coastal areas will increase in the future.

The amounts of land and water in these coastal zones will, however, remain constant and the pressure of multiple use will become ever more difficult to manage. The growth of activity in our coastal zones has been truly astonishing—far exceeding the relative population growth.

We are all aware also of the growth in recreational activities, private boating, commercial shipping, sport and commercial fishing, offshore oil production, and onshore industrial development. All of this growth must be accommodated in an area which is fixed in size. Hence, conflict in purpose inevitably arises. One man's beneficial development is another man's degradation.

The growing problems of pollution, accelerated erosion, silting, and ecological damage have been brought forcibly to our attention both in the Great Lakes and in the coastal areas.

From a technical point of view we do not know how to solve all of these problems. But we do know how to solve some of them and we certainly should improve management techniques to reduce the multiple-use conflicts as well as to anticipate difficulties before they overwhelm us.

At an appropriate time legislative proposals will be submitted to the Congress to establish policy objectives for the development of coastal areas and to authorize a Federal-State matching grant program that will assist States in development of planning and regulatory mechanisms. This program together with its supporting legislation should contribute to sensible use of land and water resources in such a way that damage to the ecology is minimized and the need and wishes of the people who live, work, and play there are fully represented.

Federal assistant grants are anticipated for initial development of appropriate planning and regulatory mechanisms and support of the Government's role as a partner in managing these important regions.

Even these first steps will not be easy. The coastal zones, estuaries, and the Great Lakes are already the focus of many conflicting and overlapping authorities. More than merely erecting a new management mechanism, the planning and regulatory mechanisms should serve as a link between the various authorities and jurisdictions within the coastal zone, with the States of the region being encouraged to take the lead to deal with their own regional problems.

The second of the priority programs is the establishment of coastal laboratories. As I have already said, we do not know how to solve many of these problems and research is essential. This project, therefore, is intimately related with the coastal-zone problems I have just discussed.

Considerable attention has been drawn by the Commission report and by its backup documents to the similar problems in the coastal zone and in the Great Lakes, but these problems also exhibit signifi-

cant differences from region to region. Pollution is a problem in most of the coastal zones but the pollutants and their sources are frequently different from area to area.

The ecology of the gulf coast, the Gulf of Maine, the Chesapeake Bay, and Lake Michigan and Lake Erie are widely different and solutions to the ecological problems must also be quite different. These and the many other regional differences require that the problems be studied and solved region by region.

The contribution that can be made by coastal laboratories that focus on these regional needs should be of assistance in assuring the wise use of our coastal zone. Such laboratories should be able to draw upon resources from industry and universities as well as State and Federal Government laboratories.

In most cases we do not believe that the establishment of wholly new laboratories is required. In almost every region there are some efforts under Federal, State, or other auspices separately studying wildlife, natural resources, pollution, industrial development, and a host of other problems.

Laboratories focused on coastal problems should attempt to draw upon these existing facilities and augment them as necessary so that the problem may be studied not just from its specific disciplinary subdivisions but with all of its complexities considered together. The solutions to certain specific problems must avoid creating new problems.

It is our hope that, by coordinating the activities of existing facilities and augmenting them, a pool of talent will be created to enable us to anticipate and assess the effects of new developments before we encounter the problems that may accompany changes.

Our attention has been drawn repeatedly to the deterioration of the Great Lakes. Unfortunately, we do not now possess all the answers we need to enable us to solve all the problems of the Great Lakes. There are, however, many presently existing problems for which we do know what needs to be done.

The Government will continue to work with State and local governments to reduce water pollution. We need to test existing knowledge and technology in a demonstration program. This might include an intensive program on a lake of manageable size. By choosing a particular lake we can isolate the problem and conduct in a sense a controlled experiment on it. This would provide a test and an illustration of how far we are able to go with cleanup activities now, as well as to learn new solutions to problems as yet unsolved.

We think this program will be a real step forward in the understanding of the Great Lakes pollution problems as well as to indicate the new directions research should take. Some of the techniques learned in demonstration projects should also apply to many thousands of other lakes in our country.

These initial priority points that I have mentioned deal with the coastal zone primarily because the coastal zone and the oceans and our lake problems are closely related.

Coming now to the problems which deal with the oceans more specifically, the International Decade of Ocean Exploration was proposed by the United States and welcomed by the United Nations General Assembly as a part of a long-term program of ocean exploration.

Members of this committee already share the views that our nation has much to gain through a national interest in the oceans.

It is also necessary that we join forces with the other peoples who share this planet with us to broaden our understanding of the oceans. The earth is sufficiently small that at some time in the future we must find ways to live together in peace and share the use of the oceans widely.

Our participation in the International Decade of Ocean Exploration reflects the U.S. interest in understanding the ocean environment, improving our ability to forecast those hazards to life and property which are prominent in the oceans, and learning more about the natural resource potential of the oceans.

We know that many other nations are willing to commit some of their resources to this increased understanding of the oceans and the United States should join with them in specific scientific studies and in the sharing of data obtained. I recently returned from a trip to six European countries discussing scientific problems, and in every one of them the marine science problem was high on their list of priorities. These international cost-sharing programs should enhance both our efforts and theirs.

Finally, we have placed Arctic environmental research high on the list of priorities. The oil discoveries in the Arctic have been much in the news in recent months. Also, after four centuries of vain hopes, a commercial ship has finally opened the Northwest Passage, not to transport the gold of the Indies, but to utilize the resources of the Arctic itself.

It is too early to forecast the full extent of our stake in the Arctic environment but it is already known to be substantial. In comparison with other nations facing the Arctic the United States has been slow to acquire the basic scientific information upon which sensible development and preservation of the Arctic environment may proceed.

Additional research efforts will therefore be focused on the polar icepack, the geology and earth resources of the Arctic, the balance of the environment and the ways in which it may be preserved.

These, gentlemen, are the initial high priority activities which the administration has selected from the wealth of recommendations made by the Marine Science Commission, Federal agencies, the President's Science Advisory Committee, the National Academies of Science and Engineering, and other interested groups and individuals.

As most of you know, a task force has also been set up under the able chairmanship of Dr. James Wakelin to look further into the range of suggestions and programs available. We hope that, among other things, they will indicate to us what some of our next priorities should be, the ways in which we can get on with the substantive job of making progress in our understanding, use, and preservation of the marine environment.

In addition, the management structure for execution of these programs will be strengthened. Under the general aegis of the Marine Science Council, lead agency assignments will be made for each of these programs such that the management capabilities of the operating agencies may also be drawn into the leadership of our marine science programs.

These lead agency assignments will be regarded as interim measures pending the outcome of the current consideration of reorganizational matters and should provide us with the effective management necessary to get on with the job now.

Thank you very much, Mr. Chairman.

Mr. LENNON. Thank you, Dr. DuBridge, for a very thoughtful and challenging statement.

The gentleman from Ohio.

Mr. MOSHER. Well, Mr. Chairman, I hope that I speak for all the members of this committee when I express my own enthusiasm for those five initiatives that were announced Sunday by the Vice President.

Dr. DuBridge, I think you have made an excellent selection of priorities there, and I hope I am right in assuming that this was not only a decision of the Marine Council, but that the announcement of the Vice President carries the full weight and support of the White House, the President, and of your office.

Dr. DuBRIDGE. Certainly.

Mr. MOSHER. I assume that the initiatives and the decisions were White House decisions.

Dr. DuBRIDGE. Certainly. There was an administrationwide study of this. Naturally the Marine Council, of which the Vice President is Chairman, took a very important part in it, but the entire administration was involved. I think you can assume that the Vice President's statements have full Presidential approval and support, and that he will use his influence to move forward in each of these areas promptly.

Mr. MOSHER. Some of us, I must admit, were a little fearful when we first heard of these initiatives last week. We were a little fearful, and I hope you will forgive us for the suspicion, that this might be a sort of diversionary tactic, a red herring, to divert our attention from the organizational question.

Can you assure us that this is not true?

Dr. DuBRIDGE. This is an attempt to get on with the job, Mr. Mosher. I think it is important, whatever organization is adopted, that we move forward on some of these important areas in the marine and coastal zone area, and there are many things that can be done now without awaiting any major change in the organizational structure of the Government.

Mr. MOSHER. I think all of us would agree with that. In fact, in 1966 when we created the Marine Council, we charged it with doing exactly that job, an interim job, but to get the momentum going and to take the initiatives that are so necessary.

So, I for one, certainly congratulate you and the Marine Council for this initiative.

Now, on page 10 you say that these "five areas have been selected for increased emphasis this year."

Dr. DuBRIDGE. Yes.

Mr. MOSHER. Actually, of course, this emphasis is going to have to continue well on beyond this year, into fiscal year 1971 in fact. To give these programs real movement, would require some additional funding in fiscal year 1971; is that correct?

Dr. DuBRIDGE. Certainly, yes.

Mr. MOSHER. You also on page 12 say that there will be some legislative proposals at an appropriate time.

Can you give us some idea as to when this appropriate time is likely to be?

Dr. DuBRIDGE. These priority areas were only finally identified within the last 2 or 3 weeks within the administration and the legislative proposals are now being worked on. I hope they can be submitted promptly, but I am afraid I can't give a specific date on that. Sorry.

Mr. MOSHER. Within the next month or so?

Dr. DuBRIDGE. I would hope so, yes.

Mr. MOSHER. Before the end of this session we will probably know what your recommendations are?

Dr. DuBRIDGE. We will want to get those as promptly as we can, yes.

May I say in connection with these points that we must not forget that the U.S. Government is investing a half billion dollars a year in marine activities of one sort or another right now. All of these programs are going forward and are budgeted and presumably will be in the President's budget, and there may be in many areas increased funding which will be requested in 1971 for existing activities of various existing Government agencies.

I do not know just how the fiscal 1971 budget will treat these areas, but certainly most existing activities will continue. These five things are over and above the great mass of existing activities and programs now within the various agencies of the Federal Government, and are designed to take initiative in getting new starts this year on these programs.

All of them of course are continuing programs that will go on for many years.

Mr. MOSHER. I think it was clearly shown in the Stratton Commission report that if this Nation is to do the job that it needs to do and live up to the opportunities that exist in the oceans, we are going to have to contemplate substantial increases in funding.

Dr. DuBridge, on page 2 you use the phrase "the more important substantive programs."

You are referring there to the more important programs among the 100 or so recommended by the Commission?

Dr. DuBRIDGE. Yes.

Mr. MOSHER. You are not saying that the substantive programs are more important than the organizational question?

Dr. DuBRIDGE. No. Just as I was reading that I realized that that was an unfortunate wording. I think in my actual statement I changed it slightly, "I will return to some of the more important substantive programs later."

Not that the substantive programs are more important than the organizational ones.

Mr. MOSHER. In terms of the immediate interest and immediate responsibility of this committee, certainly the organizational question remains extremely important despite our admiration for the new initiatives that the administration has taken.

Now, going to that organizational question, I judge from the general tone of your statement today that you don't close the door at all to reorganization legislation.

Dr. DuBRIDGE. No, certainly not.

Mr. MOSHER. And by initiatives of the Congress.

I certainly respect your position that as a member of the administration you are bound to wait until the Ash Committee makes its recommendations.

I judge from something you said that you have knowledge of the fact that the Ash Committee is actively considering this matter right now.

Dr. DuBRIDGE. Yes, I talked with Roy Ash the other day. He is an old friend of mine, and I chatted with him about it and he assured me that this was on their agenda and they were getting at it.

Mr. MOSHER. I had hoped from the tone of the President's request to the Ash Committee that this matter of reorganization in the ocean efforts would be a matter of priority consideration by the Ash Commission. Do you think that that is true?

Dr. DuBRIDGE. I think that that is true, but I am afraid that there are several other priority matters, too, and I don't know how this one stands with respect to others.

Mr. MOSHER. Now, to get back to your own statement, you definitely assure us that the administration has not closed the door, has not taken any firm position at all, negative or affirmative, on the NOAA recommendation.

You have expressed, of course, some doubts and you have pointed to some considerations that have to be made and I certainly respect that, but the administration has not closed the door?

Dr. DuBRIDGE. No, there is no firm proposal or attitude from the administration which has yet evolved. I think all of us can see problems in the particular NOAA structure which has been proposed by the Stratton Commission, at least problems in doing it suddenly and in a revolutionary sort of way.

There are very severe problems, political, organizational, structural, financial, and so on, but these are problems and not necessarily barriers to constructing some kind of a new organization. I am sure these are the problems that you will be considering as you think about this matter.

Mr. MOSHER. In your remarks on page 3 and in several other places you even suggest that we should be considering a larger reorganization to bring in even other elements, and so I judge you don't close the door at all on reorganization.

Dr. DuBRIDGE. That is right, but I made that point only to express my feeling that this is an enormous problem and is widely spread throughout the whole Federal structure and there are many related problems. You can't stop at the beach line and say, "The ocean begins here and the land ends here," because the two interact so intimately and in so many ways.

The pollution that comes into the ocean comes from the land and the land activities and the erosion and so on.

The atmosphere interacts very intimately with the ocean as well as the land. Therefore, if you are going to include everything related, you could include the whole world. You would include the whole problem of the environment. Therefore, a line has to be drawn, and it is going to be an arbitrary line, and I simply wanted to point out the difficulty that there is no logical line at which to say we will include these and exclude those. This has to be a matter of political judgment, of organizational feeling, as well as of the scientific and technological factors that are involved.

Mr. MOSHER. At the conclusion of your testimony you say, "the management structure for execution of these programs," and you are referring to five programs and programs in general, "will be strengthened," and you talk about the fact that this will be under the aegis of the Marine Science Council.

Of course, we all recognize the problem that results from the fact that the Marine Science Council by statute will die as of June 30 next year. This certainly puts on the Congress a very important deadline concerning these organizational decisions.

Dr. DuBRIDGE. That is correct.

Mr. MOSHER. Is there any inclination on the part of the administration at this point to recommend to us that the Marine Council be continued beyond the June 30 deadline?

Dr. DuBRIDGE. I am afraid, Mr. Mosher, I can't give you a firm administration position on this. I can give you my personal opinion. I believe that the problems of creating a wholly new organization are very great and that the creation of it will take a little time.

Even if we were agreed in principle on how it ought to be done, setting it up and bringing it together and so on is not a thing that can be done overnight. In order to avoid a possible gap in organizational management of marine problems, one option that might be considered would be to extend the life of the Marine Science Council for a period so that it can make sure that the lead agencies which will be designated in each of these areas are designated, that the necessary coordination is established between the lead agency and other agencies having responsibilities, and so that there can be a continuing overview of these proposals as well as others which may come along later.

Mr. MOSHER. I can assure you that the members of this committee have a high regard for the job that the Marine Council has done and is doing, and I think you are right that we would hesitate to just create a vacuum by having it disappear without any new organization; but at the same time I think I speak for the rest of the committee when I think that we are going to move ahead rather energetically in attempting to produce some legislation for a more permanent organization.

On your next to the last page you refer to Dr. Wakelin's appointment and the appointment of the new task force by the administration in this field, and it is an impressive talent that you have appointed to that commission.

Dr. DuBRIDGE. Yes.

Mr. MOSHER. Now, however, I think we are very much aware of Dr. Wakelin's testimony before this committee where he said:

There is no doubt that a unified managerial framework such as NOAA must be established if we are to pursue the recommended program.

Will the task force that Dr. Wakelin now heads for the administration be considering this organizational question parallel with the Ash Committee's consideration?

Dr. DuBRIDGE. The Wakelin Task Force is intended to give by the end of this calendar year to the administration some suggestions for next steps in the marine field. This is a group of really great experts, as you pointed out, and they are being asked to look at the Stratton report, to look at the other reports and recommendations

from various people, and suggest to the administration moves that can be taken beyond these first five moves that I referred to today.

To what extent they will consult with the Ash Council on the organizational problems I don't know. I think they probably will discuss with them some of the problems and no doubt make some remarks, but I think their main thrust will be what can the administration propose to the Congress for next year's program to make substantive progress in the marine field.

Mr. MOSHER. So the Wakelin Task Force will be considering organizational matters as well as programmatic matters?

Dr. DUBRIDGE. They will certainly have to think about how these things are implemented through the organizational structure, but they are not to replace the Ash Council in its definitive recommendation to the administration as to the organizational structure of the Government.

Mr. MOSHER. And the recommendations of the Wakelin Task Force are likely to show up in administration policy possibly as soon as the President's state of the Union address next January?

Dr. DUBRIDGE. That is the intention of all these task forces, to provide the President material for his messages early next year.

Mr. MOSHER. Mr. Chairman, I have taken more time than I should, but I would like to ask one more question.

You have borne down rather heavily on the problem of the Coast Guard and where it should be placed and have suggested that placing it in NOAA would be a very disruptive influence in the Department of Transportation.

Is that the only example or is that the most horrible example?

Dr. DUBRIDGE. Well, that was one example that occurred to me as illustrative of the point I was trying to make. The Coast Guard has many functions other than just looking at the oceans.

It regulates transportation and shipping and does many other things, and does some research in the ocean field. It is the one agency of the Department of Transportation which has to do with marine transportation. It would seem that some link to the seas, to marine transportation, is an essential activity and responsibility of the Department of Transportation. If one were to remove the Coast Guard, the Department would have to create some new organization I would think to work on the problem of ocean and lake and river transportation.

But there are other situations. The ESSA organization is pretty heavily imbedded in the Department of Commerce and has many links to the industrial world and the activities of the Department of Commerce.

I think you will recognize the Stratton Commission didn't suggest extracting the various marine activities from the Department of the Navy, but within the Navy Department are some of our biggest and most important marine activities and clearly it's a little difficult to extract those from the Navy.

That really wasn't suggested, but is another example of how marine activities are imbedded in many departments and activities.

There are many activities in the Department of the Interior which are difficult to segregate out simply because they happen to deal with the ocean as related to water supplies and water problems generally.

Mr. MOSHER. Mr. Chairman, I submit that, despite the doubts enunciated by Dr. DuBridge, his testimony very clearly shows that the administration has not as yet made up its mind for a firm recommendation either way on NOAA and that it does consider this question a high priority question within the administration, and that we can hope for some recommendations at an early date.

I hope that I have correctly interpreted the gentleman's remarks.

Mr. LENNON. Thank you, Mr. Mosher.

Dr. DuBRIDGE. Yes, I will subscribe to your statement.

Mr. LENNON. Mr. Rogers.

Mr. ROGERS. Dr. DuBridge, the committee does appreciate your being here, of course, and giving us the benefit of your testimony.

I share the concerns that my colleague Mr. Mosher has expressed that the administration will look more closely and try to move more rapidly on organization.

I realize the five programs that they have set for priority are important and although some of us might change some of those priorities, nevertheless it is an indication that the administration is moving in this area somewhat. I certainly commend them for doing this.

May I ask you do the recommendations of the Marine Council come to your office?

Dr. DuBRIDGE. Not in any official way. The recommendations of the Marine Council go directly to the President.

Mr. ROGERS. I understand that that would be so with any President.

Dr. DuBRIDGE. As a member of the White House staff we obviously are asked to review all of the scientific recommendations that are made.

Mr. ROGERS. As a matter of practical handling they would come to you and get your views before they go to the President?

Dr. DuBRIDGE. Referred to us for comment; yes.

Mr. MOSHER. Will the gentleman yield?

Mr. ROGERS. Yes.

Mr. MOSHER. Does Dr. DuBridge as the science advisor to the President sit in on any of the meetings of the Marine Council?

Dr. DuBRIDGE. Yes.

Mr. ROGERS. Then that report is given to you before it is given to the President.

What about the Wakelin report? Is the Wakelin committee working out of your office?

Dr. DuBRIDGE. No; all the task forces in principle are working out of the office of Arthur Burns, who is the coordinator for all the task forces, but I have already had discussions with Mr. Wakelin and one or two members of his task force as to the general problems they are facing so that we will be in close touch.

Mr. ROGERS. Will his report be made to you before finalized?

Dr. DuBRIDGE. It will be submitted to Dr. Burns, but I am also sure it will be at the same time submitted to us for study and comment.

Mr. ROGERS. Now, I am concerned, Dr. DuBridge, that departmental witnesses that we hear, administration witnesses that are coming up, keep, for example, repeating to us how vital to the Department of Transportation the Coast Guard is.

Mr. Mosher has mentioned it. We think of the name of the Department of Transportation as being all encompassing, but is it actually?

Dr. DuBRIDGE. I don't think any agency of Government has all encompassing responsibility over any field.

Mr. ROGERS. As a matter of fact, it doesn't have very much when you analyze it; does it?

Dr. DuBRIDGE. It does have to do with ground, air, and sea transportation.

Mr. ROGERS. What does it have to do with sea transportation? We haven't put any of the merchant marine under it. It doesn't have the Navy functions under it.

Dr. DuBRIDGE. No.

Mr. ROGERS. Does it control railroads? The ICC is the body that gives direction there. Trucks are under ICC, the barge lines are under ICC, and the ICC is not a constituent agency of the Department of Transportation.

Airline routes are not under it. CAB is not a part of it. This has become almost a fiction that is continued in testimony to say that the Department of Transportation to be effective must have some link with a third area of transportation which is marine, and I don't think in analyzing this that this really holds up.

Dr. DuBRIDGE. You may be right.

Mr. ROGERS. Yes.

Dr. DuBRIDGE. It is a problem to be considered.

Mr. ROGERS. Yes, and I wonder as to the value of the argument made then if this is the case, and I would hope you would review your feelings on this.

Now, let me ask you about this. I noticed the statement on page 5:

Many departments and agencies of Government have naturally been assigned important responsibilities in these areas—

Ocean development, environment, and so forth, but oceanography is mainly what you are trying to tell us I think.

Some of which have been carried forward actively and effectively for many, many years.

This is another thing we get from all the departments, what a grand job they are doing, and then we look at our development in fisheries resources and what do we find there?

I am sure you are familiar with the fact that we are having to import 70 percent of fish products in this country every year—70 percent. This doesn't bespeak a very aggressive policy, I think, in developing the fishery resources of our Nation. Would you agree?

Dr. DuBRIDGE. Well, this is a commercial matter having to do with many things like labor, technology—

Mr. ROGERS. No matter what.

Dr. DuBRIDGE (continuing). And many other things.

Mr. ROGERS. And lack of modernization, lack of research, lack of many things. I would agree that it is not just one but this doesn't indicate a very aggressive policy there in that area.

That is the point I am trying to make. Would you agree?

Dr. DuBRIDGE. Yes; I think so.

Mr. ROGERS. And the Department agreed in 1956 when we went into it in some degree.

Now, also I would think we see this when we are told that our merchant marine is so great and then we look at the facts, and our mer-

chant marine is deteriorating very rapidly. I know the administration is concerned about this because the President has stated that something must be done.

Yet we insert all this timidity about trying to move in this area and put some emphasis on the ocean because you say, "Well, everything is connected with the air and the ocean and the sea, and it is hard to divide."

But how much of the world is made up of the seas?

Dr. DuBRIDGE. Three-quarters.

Mr. ROGERS. Seventy-five percent. So there must be some connection between air and water that is fairly important, that we really have not put emphasis on.

What this committee is trying to do, I think, Dr. DuBridge, is to emphasize through this legislation that we need to do something in developing the resources of the sea, and we have not done it.

Now, there are 10,000 roadblocks as to why Coast Guard ought to be with the Department of Transportation, Fish and Wildlife may be with Interior, but this is a first step.

We realize that it may take a little time to bring all the functions together, and I think you have pointed out very effectively that probably NOAA as presently constituted in the legislation and in the Commission's report is not broad enough.

I agree, but we may want to get it started as a first step and then as you say, because it is difficult sometimes to set up a new agency, bring in these agencies. Do you think that would be wise?

Dr. DuBRIDGE. Or one could even go back a ways and say that NOAA is too great a first step and one should have a more restricted idea of the new agency and then broaden it later.

I think it might be an evolutionary thing. One could start with a partial approach and then go beyond the first NOAA if this works out. There are various ways to do it.

Mr. ROGERS. Yes, but I think we are at a point in the development of the nation where we need to do something a little more dramatic than just a gradual step and this is what we are hoping to develop here.

You mentioned ESSA. How aggressive really is the Department of Commerce in this area?

They have a construction program for laboratories and now you are putting great stress on coastal laboratories, one that I know of. Do you know what the entire construction program for the Department of Commerce is?

Dr. DuBRIDGE. No, I don't happen to.

Mr. ROGERS. Three million dollars. Think of that. Two and a half million for a laboratory. And do you know what they are going to have to do with it now because of our great problem of inflation, and we certainly have a problem? They have to cut it.

This is the great emphasis we are putting on laboratories. I think we should have it in an agency where we would put some emphasis and build some public support. The public support is there if it is just directed, and I don't think they have grasped in many areas of the administration this vast public support for doing something in the area.

Then when we look at the economic benefit. You may not have this presently, but you might submit for the record, if you could, what you

suppose all of the income to this nation is from the current development of the resources of the seas.

Dr. DuBRIDGE. I wouldn't have any idea.

Mr. ROGERS. I would guess it probably would be one and a half billion to two billion dollars.

We get about a half billion dollars a year from royalties on leases of oil and sulphur alone, a half billion dollars.

You mentioned we are putting a half billion dollars into our program, but that comes back to the Government immediately from resources.

Now, that doesn't count fish products, all of those other resources of the sea. So I would hope you could take a message back to the administration for a review of the economic benefit that can come and the importance of really doing something, moving ahead and not being timid.

This is what we want to get at, really doing something, and I think with your help and some leadership in the office which you hold, which is most important to this activity, that we can move even more rapidly.

I admit there will be some problems, but I think with some firm leadership we could do something, and I would hope that you can give some personal attention as I know you will to this particular problem, Doctor.

Dr. DuBRIDGE. I certainly will.

Mr. ROGERS. Thank you.

Thank you, Mr. Chairman.

(The following was supplied in response to the above:)

CONTRIBUTION TO THE GROSS NATIONAL PRODUCT FROM THE RESOURCES OF THE SEA

The total contributions to the gross national product of all oceanic resources has been estimated as of June 1969 at about twenty billion dollars or about 2% of the gross national product itself. This is the monetary contribution to the gross national product and of course does not include such non-monetary values as recreation, boating, sporting activities and aesthetic beauty. The direct yield to the Federal Treasury from bonuses, rents and royalties of outer continental shelf lands for 1969 was seven hundred and fourteen million dollars or a little less than one-half of one percent of the total Federal income from all sources. This brings the total yield to the Federal Treasury from outer continental shelf receipts to four and one-half million dollars since 1955. Most figures are expected to increase in the future.

Mr. LENNON. The gentleman from Washington.

Mr. PELLY. Dr. DuBridge, I think your statement is very helpful, at least as helpful as it can be. Your colloquy with Mr. Mosher pointed up that it is impossible to clarify any further at this time the position of the administration on this legislation.

I am not going to pass over one thing that you said however, and that is that the development of NASA, which has been so successful, involved only new programs, but a lot of those programs, of course, were in the Department of Defense and were transferred over into civilian agency rather than have them promoted by the military.

Dr. DuBRIDGE. That is true. There was a transfer and a consolidation there, but it still was a brand new area of technology, civilian space exploration which nobody was handling at that time.

The Department of Defense was not really doing space exploration except in the very tiny little Vanguard project.

Mr. PELLY. You expressed a fear of fragmentation under NOAA. Actually isn't NOAA a creature to avoid some of the fragmentation that now exists under the present organization of the Government?

Dr. DuBRIDGE. I know that is the purpose, but my point here was that as you remove one activity from a particular agency you may fragment its efforts if one is not very careful.

Mr. PELLY. Well, I thought there is so much fragmentation now that that is the reason why so many feel there should be one agency set up to house rather similar research and development activities.

Dr. DuBRIDGE. Yes, there are so many activities in the field of atmosphere, water, as well as marine and lakes and rivers and so on that are spread throughout the Government that just a transfer of these to a single agency may not completely remove the fragmentation.

In fact it may increase some of it in certain particular areas or functions.

Mr. PELLY. Well, I, too, am delighted that the administration seems to want to move forward in this field and in these particular five endeavors that you enumerated, particularly coastal zones.

Of course, that is part of the contemplated organization of the proposed NOAA.

Dr. DuBRIDGE. Yes.

Mr. PELLY. I think there is very widespread support for that, and I know in my own State I talked to my Governor and he feels that it is essential.

We will look forward to these proposals. Just exactly how they tie in with the plan of this committee to proceed with legislation, I don't know. I presume you have your own ideas, but I wouldn't be surprised if this committee might decide that after 8 years it should report a NOAA organization and it might want to put these proposals under it. This is a very difficult decision we must make.

Anyway, I think, as I say, your colloquy with Mr. Mosher did clarify about as far as we can get it now the ideas and intentions of the administration.

I think your presence here has been very helpful in that respect. Thank you.

Mr. LENNON. Thank you.

Mr. Schadeberg?

Mr. SCHADEBERG. Doctor, would you suggest that with the fragmentation that we have had or even without it as far as that is concerned, we have made as much progress as we should have made in marine science considering the effort in so many different agencies through the past years?

Dr. DuBRIDGE. No, I think more coordination of the effort is very clearly needed and you are very much aware of that. It is a question of how to make this coordination most effective. I think it is very clear that coordination of effort is very desirable in this field.

Mr. SCHADEBERG. Looking at it from the outside and looking in, because I am not that deeply involved in it, I feel that probably we have had too many agencies or too many efforts with too little supporting them financially so that we have not made the progress we intended. Possibly what we need, and I feel we do, is not necessarily

an agency that takes it over in toto but to coordinate the effort. I think this is the direction in which we ought to be facing.

Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Schadeberg.

Dr. DuBridge, I don't know if you have ever had the opportunity to read the testimony given before this subcommittee back during a good part of the calendar year 1965 and at least 4½ months of 1966 when it was considering just in substance what we are considering now.

Many Members of Congress appeared before the subcommittee, and the private sector of the economy interested in the marine sciences, our university laboratories, our States, but particularly the Members of Congress insisted that the committee, back in 1965 and early 1966, should move directly to the question of establishing a government structure such as has been recommended by the Stratton Commission, and some of them said, "Now we must move and establish what was referred to then as a wet NASA."

I find your statement which begins on line 1 of page 5 and runs through the middle of line 4 on page 6 almost verbatim, almost exactly the language that I used in counseling those Members who appeared before the committee and who wanted action then. It brings it back to me so forcefully that that is exactly what I argued with them as the chairman of this committee at that time.

They answered me by saying, "Mr. Chairman, don't you know that two different commissions in the past, even a presidential commission as early as 1962 recommended this?"

I said, "Yes, but the Executive turned down the recommendations of its own appointed commission with respect to establishing a government structure." I said, "Let's try again."

I insisted that we try again. So this committee and subsequently the Congress moved on to the enactment of Public Law 89-454, which became law on June 17, 1966. I say this because I don't know how you were involved at that time or whether you even knew anything about it.

Dr. DuBRIDGE. I was not involved then.

Mr. LENNON. That is my understanding. I want to get the record clear that you were not, so that you do not have the history of how we have been involved with this very question.

I give it to you because I think you are open minded about this whole related matter that we are discussing this morning. We insisted that the President find in his selection and appointment to this Commission men of the technical background, the knowledge, the skill, the experience and particularly the dedication and especially those people who could give the time, the consuming time to make a study in depth and recommendation, and I might say to you, sir, and the gentleman from Ohio has commented on the splendid work done by the national council, that the administration resisted the inclusion in Public Law 89-454 of the establishment of a national council to do what? To coordinate the various civilian agencies involved in the marine sciences and to project programs in the interim until such time as the Congress received the Commission's report.

If we had capitulated to the administration's position, we would have had no national council, and within 6 months after the law was enacted the administration was the first to admit what a grave mistake would have been made if we had not insisted upon the establishment of the council.

Now we see the Vice President moving in the direction in which we mandated him in that legislation, to coordinate and to project programs, not structure but programs.

So I was struck by the language you used because it recalls to my mind that that was the specific language that I used as the chairman of the committee in responding to the witnesses who appeared before this committee in 1965 and in the first 4 months of 1966 insisting that we do then what we are considering now.

I am historically a moderate or a conservative. I want to move carefully. I want to be sure. So that I wanted you to have that background.

Dr. DuBRIDGE. It is very interesting.

Mr. LENNON. Now, you are very commendatory in your appraisal and judgment and evaluation of members of the Commission. I recall so vividly that 2 weeks ago tomorrow, I believe it is, that in the appearance here of the Assistant Secretary of Commerce, who was accompanied at the witness table by Dr. White, the Administrator of the Environmental Science Services Administration, and this distinguished witness who is new, too, I might say.

Dr. DuBRIDGE. Dr. Tribus.

Mr. LENNON. Yes. He said that, "There are bound to be alternatives to the recommendation relating to the governmental structure, but I can't find them in the report."

I said, "Fortunately we have with you, Mr. Secretary, at your left as one of the cowitnesses appearing for the Department, a gentleman who served on the Commission and should be in position to tell us whether or not the Commission explored many, many alternatives."

I said, "Dr. White, did you or did you not or can you say whether or not the Commission explored the many alternatives that the distinguished Assistant Secretary has indicated are not found in the Commission's report?"

He said, "We did in depth."

And I am sure that they did.

Dr. DuBRIDGE. Surely.

Mr. LENNON. I happen to know that of my own personal knowledge, but of course it was not generally known because the gentleman from Ohio and myself were privileged to be advisory members of the Commission—to do nothing except to point out to them the congressional intent, to keep them constantly advised based on the colloquy and debate and the testimony before the committee as well as the debate on the House and Senate floor.

Of course we were likewise privileged to have two Members of the Senate as congressional advisory members of the Commission. So that is the background, and I think you would be interested too that it was conclusively stated by Dr. White and then subsequently at the same hearing agreed to by the Assistant Secretary of Commerce that if a new Government structure was brought into being that it was fundamental and essential that the Environmental Science Service Administration be placed in that agency.

Now, you have talked about the Coast Guard. We were also privileged to have the Assistant Secretary of Transportation, and he was articulating rather eloquently about the essentiality of the Coast Guard as related to Transportation.

I said, "Well, how is the Coast Guard related to Transportation?"

He said, "The merchant marine, of course."

I said, "But where is the Maritime Administration? Is that in the Department of Transportation?"

Of course, it isn't. It's in another department.

Now, the argument is made that the Coast Guard should be kept in the Department of Transportation because of its relative position with the Maritime Administration, and the Maritime Administration is, of course, in still another agency or department of the Federal Government.

So, we just sometimes wonder if the right hand in Government, as is true in personal life and corporation life, too, knows what the left hand is involved in sometimes.

Now, you go on to say here on page 8, speaking of the specific substantive proposals that you directed your attention primarily to: "These proposals exhibit the thoroughness and care with which the Commission did its work."

Could you say with any less degree of certainty that the Commission did not exhibit thoroughness and care with respect to their recommendation of a Government structure?

Dr. DuBRIDGE. No; I didn't intend to imply that.

Mr. LENNON. I know you didn't intend to imply it, but you lay emphasis on these proposals and give great credit to the Commission for the thoroughness with which the Commission did its work in these particular proposals, and I do not think that you intend, and you clearly stated that you did not intend to imply that they did not give the same degree of care and study and thoroughness to the question of a Government structure.

Now, I think just for the record, since Dr. Wakelin has been appointed as head of the task force by the President—and I assume that that is true.

Dr. DuBRIDGE. Yes, sir.

Mr. LENNON. To make a study in the field of oceanography.

Dr. DuBRIDGE. Yes, sir.

Mr. LENNON. He appeared before this committee on Tuesday, May 20, 1969, and I quote from his prepared statement. Now, this was not something that he just agreed with. This is from his prepared statement, and I quote:

I concur in and support the recommendations of the Commission—meaning the Stratton Commission—in regard to the national ocean program and the organizational structure to implement it.

To continue:

There is no doubt that a unified managerial framework such as NOAA must be established if we are to pursue the recommended program.

And I continue to quote:

There is also no doubt that, to obtain the advice and counsel of the States, regions, industry, and the academic community, we require the establishment of the National Advisory Committee for the Oceans.

This is a pretty strong statement and if anybody has been involved in this field longer than Dr. Wakelin, when he was Assistant Secretary of the Navy, I don't know who it was.

You mentioned the Navy. I think you should be reminded of the fact that there was a distinguished Assistant Secretary of the Navy as a member of the Commission and as soon as he left the administration

for which he was the spokesman—and of course I appreciate the fact that neither he nor Dr. White or the Assistant Secretary of the Interior who were members of the Commission participated in writing the report related to the Government structure and that was proper, but he sat before this committee and said—since he left the former administration—as an individual:

I give my unqualified support to the recommendations of the Commission regarding the Government structure and also the Government commission.

That is something for us to relate to; isn't it?

Dr. DuBRIDGE. Yes; certainly.

Mr. LENNON. I don't want to be and I am not going to be critical. I was a little concerned about a speech recently made by the Assistant Secretary of Transportation, Mr. Paul W. Cherington, and I may yet ask him to appear before this committee.

You deferred to the administration with respect to making a categorical, flat statement with respect to the governmental structure. You deferred. Do you think Mr. Cherington was courteous enough to the administration to defer to the administration when in this recent speech he castigated the Commission report so far as it related to the Department of Transportation as it affected the Coast Guard?

I say, frankly, I was not happy with the Secretary of Transportation's public utterance on this subject some time ago. He didn't wait until even the President sent the letter to the Ash Commission on May 19. He spoke out and said, "No." That is human nature. It is the same all over the world. It is inherently selfish and because of the human nature we have to live with it and accept it.

No agency or department wants to lose anything that it has ever attained.

I was disappointed that in adhering to tradition you let the administration speak officially but the assistant Secretary of Transportation or even the Secretary did not await the administration, but that is because they had the Coast Guard in the agency and had to protect their own.

You say on page 12, on line 7, with respect to the programs that have been recommended by the National Marine Science Council at the press conference of the Vice President:

"At an appropriate time legislative proposals will be submitted to the Congress to establish policy objectives for the development of coastal areas," et cetera.

When is that "appropriate time" in point of time?

Dr. DuBRIDGE. Well, as soon as we can possibly get them together. As I said to Mr. Mosher, I don't know what the schedule is on that. In fact, I think the schedule has not been established yet.

Mr. LENNON. Based on the experience we have had with the Ash Commission I just wonder what point of time we are talking about.

Dr. DuBRIDGE. This is our legislative proposals for this particular coastal zone problem. This ought to be much easier to bring to you than the Ash Commission study.

Mr. LENNON. The reason I asked this question, sir, is that you know or you may not know, that next week the committee is having convened in Washington a symposium, forum, or conference in which all the coastal States and all the lake States have been invited to send representatives to Washington to see how the recommendations of the Com-

mission could be implemented with respect to the coastal zones and the regional laboratories. Therefore, I would like to know if you all have seriously thought about this or if it is just something that you are saying that you intend to do sometime in the future because you are talking about the thing that they are going to meet here on next week.

Mr. MOSHER. Would the gentleman yield?

Mr. LENNON. Yes.

Mr. MOSHER. I think Dr. DuBridge in response to a question from me indicated that he would certainly hope and expect that this legislation would be recommended to us well before the end of this session of Congress. I hope he is right, but I would think that the legislation could well consider the outcome or the recommendations that may come out of this very timely meeting that you have called next week.

I hope that the administration will be participating in that meeting and very genuinely observing the advice we get from the coastal States.

Dr. DuBRIDGE. I will certainly report back your sense of urgency on this and see what can be done to accelerate it.

Mr. LENNON. I thank the gentleman for calling that to my attention because there are a number of people at the executive level in the departments participating either as panelists or as moderators on this very subject.

Dr. DuBRIDGE. Yes, sir.

Mr. LENNON. I got the impression from you, sir, that perhaps this legislation was expected shortly after the turn of this calendar year. But now you are reassuring the gentleman from Ohio that it will be sent up to Congress in some reasonably definitive form or at least as a vehicle which the committee can consider in this calendar year.

Dr. DuBRIDGE. The intention is to try to act promptly on this, but I am sorry that I cannot guarantee you a schedule. I do not know in what state the legislative proposal writing now is, but I will carry back your message of urgency and see if it cannot be accelerated.

Mr. LENNON. Now, the same thing of course you say on page 13, line 9, "The second of the priority programs is the establishment of coastal laboratories."

Which is related, of course, to your first legislation.

Doctor, someone suggested the other day that suppose there had been six, seven, eight, nine, 10, 11 agencies which were interested in space some 10 years ago. It is not likely that that would have been, but assuming it had been so, is it likely that we would have had a man on the moon with 11 departments desiring to continue their efforts?

Dr. DuBRIDGE. This took a coordinated effort. I certainly agree. The point is not that it isn't desirable to have concentration of responsibility in one agency. The reason I mentioned the difference between NASA is that it was not only desirable but easy to do because there were no conflicting governmental responsibilities and traditions of long standing.

In the ocean area you face the organizational difficulty that no matter how desirable one might think a coordinated wet NASA might be, the task of creating it is far more difficult, politically, from the point of view of the conflicting interests of various committees of the Congress, the conflicting interests of the various agencies and departments of Government, that the task is very much more difficult and will re-

quire very much more painful surgery, will require much more careful consideration of other related interests.

So that I am only saying that the organizational problem is far more difficult than it was in the case of NASA. I am sure you must realize that.

Mr. LENNON. The Secretary of Transportation said in essence that the Coast Guard must remain in Transportation to keep its essential functions intact.

Well, now, what essential functions did the Coast Guard acquire subsequent to its move from the Department of the Treasury to the Department of Transportation? Do you know of any?

Dr. DuBRIDGE. I am sorry. I can't answer that. I don't know.

Mr. LENNON. Well, I happen to be a member of the Coast Guard subcommittee and have lived pretty closely with the Coast Guard in the last 12 or 13 years. I don't know of a single function that they have acquired since they moved from the Department of the Treasury, where they had historically been, to the Department of Transportation.

I know how the Coast Guard feels about this proposal. They have talked to me rather strongly about it. I was delighted to have their personal views.

Off the record.

(Discussion off the record.)

Mr. LENNON. Are there any other questions, gentlemen?

Mr. MOSHER. Will the gentleman yield?

Mr. LENNON. Yes, sir.

Mr. MOSHER. Just in comment, in talking to the Coast Guard people, I think they have not yet grasped the concept that is inherent in NOAA and in the considerations and recommendations of the Stratton Commission, the concept of a Coast Guard with a really vastly expanded role in government.

I think if they caught the vision that is there, that they would be more enthusiastic about this role.

Dr. DuBRIDGE. Doesn't this suggest one of the problems which the chairman has hinted at? The proposed NOAA has a wide variety of functions. Some of them are straight scientific research, exploration. Others are technological development, new technologies, new ways of doing things in the sea, deep diving equipment, for example.

Others have to do with development closely related to commercial problems and still other have to do with the commercial problems themselves, the actual commercial operations of fisheries or of the merchant marine, and so on.

It may be that what is worrying some people is this wide range, this wide spectrum of responsibilities going all the way from rather basic research which scientists are doing and want to do on up to how do you get a more profitable merchant marine or a more profitable fishing industry.

These are widely separated kinds of activities, and I think this is where you will find some questions raised in regard to putting all of these into a single package.

Mr. MOSHER. The span of responsibility is always a question of administrative skill to some extent.

Dr. DuBRIDGE. Yes.

Mr. MOSHER. Dr. DuBridge, we have conflicting testimony before this committee on the question of whether it is wise or practical to put

under the same administration day-to-day operational functions and scientific research and technology development functions. We have had people say that it is very good to put them together because they nurture each other and there is an interrelationship that is very important and therefore it is good.

We have had also advice that if you put operating functions with science functions, and the example given to us was ESSA, the operational functions tend to be neglected because there is too much emphasis on science. I think this again is strictly a matter of administrative function.

Then we have had the other advice that if you put them together inevitably the science function will suffer in terms of funding whenever the budget gets tight. So we certainly have a lot of conflicting evidence on this subject. Do you want to offer your wisdom?

Dr. DuBRIDGE. I think I would rather leave the organizational problem right here.

Mr. LENNON. Thank you, Mr. Mosher.

It has been suggested by counsel that if there are any additional supplemental remarks of any of our previous witnesses we would get the word to those who wanted to add to the record that it is his desire to end this present phase of this hearing record by November 1, in order that it will be sent to the printer.

The next meeting of the subcommittee will be held on October 28 at 9:30 a.m., for the purpose of convening the coastal zone management conference. This meeting will be held in room 345, the large conference or caucus room, in the Cannon House Office Building. I would urge the staff of the committee to contact all of the members of the subcommittee and urge them to be present for at least 10 minutes of that conference that morning as it is my desire to introduce them to some of their constituents and to the people attending the conference from some 30-odd States who have been invited.

Dr. DuBridge, we appreciate your continuing interest in this matter and your splendid presentation and fair approach to the matter this morning. Thank you so much, sir.

Dr. DuBRIDGE. Thank you very much, sir.

Mr. LENNON. The meeting will now adjourn.

(The following was supplied for inclusion in the printed record:)

STATEMENT OF DR. DAYTON H. CLEWELL, CHAIRMAN, NSIA OCEAN SCIENCE AND TECHNOLOGY, ADVISORY COMMITTEE AND SENIOR VICE PRESIDENT, MOBIL OIL Co.

Mr. Chairman and Members of the Committee: We appreciate very much this opportunity to appear on behalf of the National Security Industrial Association and its Ocean Science and Technology Advisory Committee to present our views on the Government organization recommendations contained in the report of the Commission on Marine Science, Engineering and Resources, "Our Nation and the Sea" and H.R. 13247.

I will begin by reporting briefly on the salient features of the National Security Industrial Association. The Association was founded in 1944 as a result of the encouragement of James Forrestal, then Secretary of the Navy and later the first Secretary of Defense. It is a non-profit association of approximately four hundred American industrial, research and educational organizations of all types and sizes, representing many segments of industry in all parts of the United States. Its primary function is to provide effective communication between industry and the Government in matters relating to national security. It operates in two major ways: first, through a structure of twelve standing advisory committees, including anti-submarine warfare, ocean science and tech-

nology, food, distribution, international, maintenance, procurement, quality and reliability assurance, research and development, technical information and training. These committees provide advice and technical assistance to the government—either on request or on the Association's own initiative. The other means through which NSIA performs its communications role is a program of national activities, embracing professional symposia, conferences, industry briefings and visits to defense and other government installations.

It was the lack of such an organized communications medium between government and industry in World War II that prompted the formation of NSIA.

The problem inherent in the oceans in regard to anti-submarine warfare promoted NSIA's Oceanography Subcommittee to be established in 1962. At its founding, Dr. James H. Wakelin, then Assistant Secretary of the Navy for Research and Development, predicted that before too long, that small subcommittee would grow to full Advisory Committee status. He was surely correct, for in 1965, the Executive Committee of NSIA established our Ocean Science and Technology Advisory Committee (OSTAC).

Ever since its formation OSTAC has provided a mechanism for productive exchange between Government agencies and industry groups on oceanic matters that appears to have filled an essential need. The summary of one of its reports, which was submitted in early 1966, "Industry and the Ocean Continental Shelf", was incorporated in its entirety as Appendix III of the Report, "Effective Use of the Sea", written by the Panel on Oceanography of the President's Science Advisory Committee. A second and more detailed report on the same subject was submitted in November, 1967, to the Stratton Commission and to the National Council on Marine Resources and Engineering Development.

In the late fall of 1967, a special study was performed by the Committee in response to questions directed to it by Dr. Robert A. Frosch, Assistant Secretary of the Navy (R&D) and the Chairman of the Committee on Research, Education and Facilities of the Council on Marine Resources and Engineering Development. The results of this study were subsequently transmitted to the Commission. The subjects encompassed the following:

Goals of the National Ocean Program as seen by industry;

Delineation of the proper roles of the Federal Government vis a vis industry; and

Recommendations concerning the advisability of a statutorily recognized Advisory Committee which would permit inputs from those not in the Federal Government Sector.

The Commission's recommendations reflect many of our guidelines for proper Government-Industry roles. Specific reference is made to our contributions to the Commission on pages 282 and 284 of the Commission Report.

To indicate our continued interest, I call attention to the committee's 1969 annual meeting, which had as its main theme—"After the Stratton Commission Report, What?" Copies of the proceedings of that meeting have been made available to each of you and to the conference participants.

With me today is Dr. Chalmer G. Kirkbride, who testified before you previously in a personal capacity. Dr. Kirkbride is the Vice President (R&E) of Sun Oil Company and until April of this year, Chairman of OSTAC, and I might add, he is also a trustee of NSIA.

It is now my pleasure to introduce the Chairman of the Executive Committee of the NSIA Ocean Science and Technology Committee, who will present our prepared statement. Mr. Amor L. Lane of American Machine and Foundry Company, and while on extended leave from AMF, was a full time member of the Stratton Commission Staff.

Thank you.

BIOGRAPHICAL DATA

Dayton H. Clewell is a senior vice president of Mobil Oil Corporation and president of Mobil Research & Development Corporation. He is a native of Berwick, Pennsylvania. He received his B.A. degree in 1933 and his Ph. D. degree in physics in 1936—both from the Massachusetts Institute of Technology.

He was employed as a physicist by the C. K. Williams Company in Easton, Pa., from 1935 to 1938 and worked on the optical properties of pigments. In 1938 he joined the Magnolia Petroleum Company (formerly the Southwest affiliate of Mobil) in the geological department, and worked on the development of oil prospecting instruments.

In 1942 he was transferred to the company's field research laboratories in Dallas, Texas as supervisor of physical research. From 1946 to 1952 he was assistant director of the laboratories, and on March 1, 1952 he became director. In October, 1956 he came to New York as general manager of the research department, and on January 1, 1962 he became general manager of research and engineering.

In February, 1964 he was elected senior vice president for research and engineering.

Dr. Clewell is the author of several papers in the fields of experimental physics and geophysics and on the general subject of petroleum research.

He is a member of the General Committee on Air and Water Conservation of the American Petroleum Institute, Society of Automotive Engineers, American Association of Petroleum Geologists, American Physical Society, Sigma XI, Society of Exploration Geophysicists, New York Academy of Sciences, and a Fellow of the Institute of Electrical and Electronic Engineers. He is also a member of the Directors of Industrial Research and the Industrial Research Institute.

He is a member of the M.I.T. Corporation—the Governing Board of the Massachusetts Institute of Technology—as well as a member of the Visiting Committees for Sponsored Research and Nuclear Engineering of M.I.T.

He is a member of the Science and Technology Advisory Council to the Mayor of the City of New York.

Dr. Clewell is a resident of Darien, Connecticut, and a member of the Board of Directors of the Darien Historical Society.

STATEMENT OF AMOR L. LANE, CHAIRMAN, EXECUTIVE COMMITTEE NSIA OCEAN SCIENCE AND TECHNOLOGY ADVISORY COMMITTEE (NSIA/OSTAC)

Mr. Chairman and Members of the Subcommittee on Oceanography : Dr. Dayton Clewell, Chairman of the Ocean Science and Technology Advisory Committee of the National Security Industrial Association, has just reviewed briefly the purpose and history of the NSIA and some of the key activities of our Advisory Committee.

It is recognized that industry has a responsibility to contribute its views on the optimum use and development of ocean resources. In view of this and our past and continuing involvement in recommendations concerning the National ocean program and the need for Government reorganization, we are especially honored to have the privilege at this time of making several specific comments on the Government organization recommendations found in the Report of the Commission on Marine Science, Engineering and Resources.

These comments on organization represent the views of the Executive Committee of NSIA's Ocean Science and Technology Advisory Committee (OSTAC). I speak to you today in my role as Chairman of this Executive Committee. A list of the members of the Executive Committee is enclosed. In reaching our conclusions, we attempted, whenever time permitted, to consult with the full membership of our five industry panels of OSTAC. These panels include those of the petroleum, mining, fishing, recreation and chemical industries. However, the views presented here do not necessarily coincide in every detail with those of all of the individual members or companies they represent.

EXECUTIVE DEPARTMENT RECOMMENDATIONS: NATIONAL ADVISORY COMMITTEE, NATIONAL OCEAN AGENCY AND THE INTERAGENCY MECHANISM

First, we will discuss the three fundamental recommendations concerning the Executive Department: (a) a National advisory committee, (b) a National ocean agency, and (c) a Federal interagency mechanism.

A national advisory committee

OSTAC agrees with the Commission's recommendations that a National advisory committee for the oceans should be established. In our opinion, the major functions of the committee should be as follows:

To advise the President, the Congress and a National ocean agency, along with other Government agencies, on ocean related activities; and

To submit periodically to the President and the Congress on assessment of the National ocean program, including a review of the activities of a National ocean agency.

The Commission Report recommended that fifteen members be designated by the President with the advice and consent of the Senate; this number seems like a reasonable one. The Commission also proposed that members "serve for fixed overlapping terms and be drawn from States, industry, science and other appropriate areas." Coastal State voting representation and Federal observers representation were recommended by the Commission.

OSTAC suggests, however, that *State and Federal* government representation on the advisory committee should be through non-voting participants. Each of the principal government agencies concerned with marine matters, such as the Navy, the National Ocean Agency, the Interior Department, the Corps of Engineers, AEC and NASA, should designate a senior policy official to participate and furnish information and opinions from his agency. State representatives should be from each of the coastal regions, including the Great Lakes. Representation and make-up of this advisory committee are most crucial. We believe all voting members should come from the private sector, including universities and oceanographic institutions. In view of industry's conspicuous leadership in the utilization of the ocean, we also believe that a majority of the voting members should have extensive industrial experience and should be drawn primarily from companies involved in direct use of the sea. Those industries that supply hardware and services also should be represented.

The National advisory committee should be provided with a full-time staff and, we would like to emphasize, this staff should be independent of that of any National ocean agency.

The Commission Report cites the report of its Panel on Marine Engineering and Technology (page VI-24) where a number of more specific functions are listed which might be assigned to the National advisory committee. We endorse these functions with slight modifications, and believe they are important enough to call to your attention, OSTAC's suggested modifications are in parentheses. They are as follows:

- Review and advise on updating the 10-year objectives of the National ocean program;

- Assess current levels of activity in terms of accomplishing the 10-year objectives;

- Identify deficiencies and recommend assignment of responsibilities to rectify them;

- Recommend means to eliminate unintentional duplication of effort;

- Review and offer a national perspective to the plans and budget requests of the U.S. Government agencies by taking into account efforts outside the Government;

- Recommend lead agencies for marine programs having multi-agency interests, and recommend whether specific marine programs can best be undertaken by the Navy, by the new consolidation of appropriate existing agencies, or by an agency not included in the civilian consolidation;

- Offer guidance and recommend important new ocean programs and facilities for the overall National program, making effective use of the competence of both private and Government organizations;

- Promote means for collecting, processing and disseminating pertinent technical information.

- Recommend an adequate level of programs and facilities for marine education and training.

- Anticipate, focus attention on, discuss and recommend (methods for) the resolution of multiple-user conflicts.

- Help to ensure that the National program has proper and continual visibility to State and municipal governments, private enterprise, the academic community and especially to the Congress and the public.

- (Serve, when appropriate, as the focal point and the source of information upon which the plans and arrangements for international programs should be based.)

- Generate pertinent activities on its own consistent with its overall responsibilities.

OSTAC does not represent a specific industry. Indeed, we have multiple industrial representation: petroleum, fishing, chemicals, mining, recreation, aerospace, etc. When our executive committee deliberates, we try not only to summarize the views of our individual industry panels, but also try to reconcile any diverse viewpoints. In these deliberations, a more complete and factual understanding of a matter inevitably is developed, resulting in most cases in

a consolidated viewpoint. Hence, our ultimate effectiveness, it is hoped, is greater than the summation of parts; that is, it is strengthened when a consensus can be established which draws upon our diverse industrial representation. OSTAC also has interaction with the Federal Government, States and universities. Therefore, we have a great appreciation for the value of a National advisory committee in helping to guide a National ocean program and strongly support its formation.

A National ocean agency

Although OSTAC did consider at some length the need for a statutorily recognized advisory committee in its study submitted to Dr. Robert Frosch and to the Commission, it did not at that time, in February, 1968, make specific recommendations concerning Federal agency reorganization except to say that the Government should "establish and maintain a system to provide for the planning and coordination of the National program."

The Commission recommended the establishment of a new independent agency to report directly to the President. Dr. Stratton, in his testimony to the House Subcommittee on Oceanography, on April 29, 1969, emphasized that the formation of such an agency, "recognizes the environmental unity of land, sea and atmosphere . . ." The Commission suggested that the agency might be called the National Oceanic and Atmospheric Agency (NOAA). The Commission further recommended that it initially be composed of the U.S. Coast Guard, the Environmental Science Services Administration, the Bureau of Commercial Fisheries (augmented by the marine and anadromous fisheries functions of the Bureau of Sport Fisheries and Wildlife), the National Sea Grant Program, the U.S. Lake Survey, and the National Oceanographic Data Center. Other functions were suggested for later transfer, including the National Center for Atmospheric Research (NCAR) and the Arctic and Antarctic programs. The recently formed National Oceanographic Instrumentation Center might also be a candidate for later incorporation into NOAA. Certain other functions, such as those of NASA, AEC and Navy, were specifically *not* recommended for transfer.

Those departments from which these agencies would be withdrawn have generally objected. Comments have also been heard in testimony stating that an ocean oriented agency should not be separated from a "land" agency or that it would be preferable to create a larger agency organized around the environment.

OSTAC believes that it is feasible and desirable at this time to consolidate certain civilian oceanic efforts into a National ocean agency. This consolidation and resulting leadership would provide a sufficiently large or critical mass to lead the Nation's civilian ocean program and to promote the advancement of ocean science and technology. Some of its expected benefits include the following:

- Increased efficiency through the sharing of manpower, facilities and ships;

- Enablement of the head of a National ocean agency to *direct* the efforts of the consolidated agencies rather than having to rely on persuasion and coordination; and

- The launching of new multipurpose science and fundamental technology activities.

The rationale for consolidation is discussed at greater length on pages 227 to 230 of the Commission Report, and on pages V-2, V-18 and V-19 of the Report of the Panel on Industry and Private Investment.

OSTAC is not prepared, however, to comment on which Federal ocean functions and activities should be consolidated because of the many factors to be studied and the many considerations to be reconciled within the Federal organizational structure. In this presentation, therefore, the term "National ocean agency" is used to describe the agency, however it might be established either as to function or reporting relationship, which will lead the civilian Federal ocean program. One example of a feasible approach that could accomplish what is needed is the consolidation of certain existing agencies along the lines of the National Oceanic and Atmospheric Agency as recommended by the Commission.

OSTAC believes that the main concern of the National ocean agency should be with programs of scientific research, fundamental technology and essential supporting functions, such as those necessary for expanding use of the sea, for

monitoring and predicting the state of the total air-sea environment and for exploring the feasibility of storm control.

The establishment of a National advisory committee and the consolidation of certain Federal ocean activities are most important recommendations, essential to the development of a coherent National ocean program. Together they would provide leadership, coordination and the opportunity to minimize wasteful duplication for great diversity of interests and activities in oceanic matters in Federal and State agencies, the many industries with marine interests and the universities and institutions. They would provide the Executive Branch and the Congress with a better focus on the total program than the present dispersion of marine activities.

As stated above, we have heard arguments that many ocean activities are intimately related to similar activities on land and that, therefore, an agency dealing with the ocean exclusively would not be warranted. However, we believe that it is in our national interest *at this time* to initiate a more comprehensive oceanic effort. The reasons have been stated quite eloquently in the opening paragraph of the Commission Report which are repeated here:

"How fully and wisely the United States uses the sea in the decades ahead will affect profoundly its security, its economy, its ability to meet increasing demands for food and raw materials, its position and influence in the world community, and the quality of the environment in which its people live."

These are essentially, as Dr. Stratton pointed out in his testimony, human problems requiring prompt attention. We are at the stage in our country's history where the ocean's potential must be thoroughly examined to determine how it can best be used in order to help solve these problems.

Only about 3 percent of the Federal Government's annual expenditures for all research and development programs goes into oceanic R & D, where this figure also includes the classified portion of the R & D budget. The current rewards and future potential value of this nation's ocean activities appear to justify a higher percentage. We believe that an agency concerned specifically with ocean programs would be better able to evaluate and justify the portion of the total R & D funds which should be allocated to oceanic programs.

One question of immediate importance concerns the *administration* of ocean non-living resources. In reviewing the Commission Report on page 141, we note the statement that the, "Department of the Interior should continue to assess the national interest in ocean minerals and decide whether the results of mineral investigation and technological developments warrant specific action to provide further encouragement to industry to mine the seabed." OSTAC concurs in this statement, and wishes to add the following comments.

Governmental activities in the administration of non-living ocean resources should remain where they are because administration of such resources is not peculiarly related to the ocean as distinct from those resources on land. Moreover, the administration of all non-living resources—land and sea—under Federal Government jurisdiction must be conducted so that all the options available for assuring adequate low-cost supplies of energy and metals can be dealt with most advantageously.

Although we are in agreement with the Commission Report on the foregoing matter, we do wish to cite examples of where the Commission Report would benefit from a further clarification of the functions of the proposed National ocean agency and the Department of the Interior. One example is the apparent anomaly on page 141 of the Report which assigned the responsibility to NOAA for funding and conducting recommended geological surveys and which stated that NOAA should also "work closely" with the Interior's Geological Survey. One question is what would the geological mapping group of the Interior's Geological Survey be asked to do that would not be done by NOAA? The subject of "surveys of mineral resources" is addressed more explicitly in the bill H.R. 13247, page 6, lines 13 and 14. In our opinion, the management and funding of these surveys should remain the responsibility of the agency now performing this function. Assuming the creation of an effective Federal interagency mechanism, we believe that this approach is feasible and proper. A second example requiring clarification is the statement in the next paragraph that, "NOAA should develop the basic technology to assess the feasibility of seabed mining but should secure the assistance of the Bureau of Mines in this task."

A Federal interagency mechanism

The Commission Report states on page 244 that major benefit of establishing a strong operating agency concerned with marine activities would be to permit

the head of that agency, at the direction of the President, to assume responsibility for interagency planning and coordination of Federal civil marine programs.

We believe that such a mechanism is the third important element of the Executive Department reorganization and that it should be statutorily created. We also agree with the words found on page VI-25 of the Commission Panel Report on Marine Engineering and Technology which states the following:

"To complement and support the efforts of the agency and NACO and to recognize the fact that many marine activities would still be located outside any consolidation, it is recommended that an interagency coordinating mechanism be established and chaired by the head of the new civilian agency. This mechanism would ensure the inclusion of the interests of all Federal agencies with marine programs not included in the proposed consolidation."

This assignment to the director of a National ocean agency would be analogous to the role formerly played by the Assistant Secretary of the Navy (R & D) in which he chaired the Interagency Committee on Oceanography (ICO). Hence, the director of the National ocean agency, wearing both hats, would be the true focal point for non-military marine affairs.*

A major role of the interagency mechanism would be one involving information exchange which, as stated earlier, would facilitate planning and coordination. The role of the Director should include offering guidance, opinions and information about on-going and planned programs, seeking to avoid unintentional duplication of effort, helping to insure the build-up of required competence and facilities, and seeking to maximize the utilization of existing capabilities. In his appearances before Congressional Committees, he should be the most knowledgeable in the Federal civilian agencies with respect to marine affairs. Accordingly, his opinions and testimony would presumably carry considerable weight in determining the priorities of civilian marine programs.

No civilian agency will have marine R & D capabilities anywhere near those of the Navy within the near future. Moreover, the Navy will undoubtedly continue its strong oceanographic efforts primarily in response to its defense mission needs. Thus some means must be established to insure that our civilian ocean program utilizes the Navy capabilities. OSTAC believes that an interagency mechanism will provide this opportunity and that the role of the Navy in the interagency mechanism will be crucial. Hence, the director of a National ocean agency would be expected to rely heavily on the Navy's capabilities. In fact, subject to security considerations, it would be expected that the Navy might be called upon to perform various services or permit use of its facilities by a National ocean agency on a cost reimbursable basis. As the agency capabilities are built up, the Navy should continue to be an extremely valuable source of information and services.

Similarly, the role of the interagency mechanism can be quite important with several of the other agencies, such as Interior and the Army Corps of Engineers. In addition, as mentioned before, we have heard the comments which state that oceanic and certain land activities should be closely coordinated. We believe that such coordination can more readily occur through the Federal interagency mechanism as recommended by the Commission.

SOME CONTROVERSIAL QUESTIONS ABOUT THE NATIONAL OCEAN AGENCY AND THE NATIONAL ADVISORY COMMITTEE

There are those who have opposed the establishment of a National ocean agency at this time for two vital reasons: 1) no agency should be established until the Administration completes its current studies on overall Executive Department reorganization; 2) the current financial situation imposes severe limitations on allocation of funds for new areas such as oceanic development.

With respect to the first point, OSTAC notes the statement in the Commission Report (page 249) that the organizational recommendations "are believed to be consistent with any of the several fundamental reorganizations that might evolve over the next several years."

With respect to the second point, the creation of a National ocean agency and a National advisory committee does not per se require any initial large expenditures. On the contrary, the creation of means for coordinating and consolidating existing, as well as any new projects, and for eliminating unintentional

*Page 231 of the Commission Report states that the National ocean agency should coordinate the civilian marine activities of the other Federal agencies. However, the bold print recommendation found on page 245 states that the agency director should have this coordinating responsibility. We believe it was the Commission's intent to vest this coordinating responsibility in the hands of the agency director, not the agency.

duplication of effort, would be a most effective step in insuring maximum benefit from whatever funds are allocated to this area of activity. If all that was done now was merely the enactment of a National ocean agency with an advisory committee and an interagency mechanism, this in itself would do much to get the nation to move in the right direction.

The National Projects and requests for additional research and for fundamental technology programs would require increased expenditures in the future. On the other hand, many of the Commission recommendations which deal with the removal of legal/regulatory impediments do not involve the expenditure of large funds and, in fact, can be implemented in a short amount of time. Finally, and of equal importance, many of the recommended new oceanic efforts are aimed at other national goals which encompass many social and economic problems. These include health (the need to prevent further pollution and initiate restoration of our estuaries and Great Lakes) and the rebuilding of many of our port and harbor facilities which are simultaneously related to such nationally recognized priority areas as urban renewal and the need to rebuild our merchant marine. The recommended oceanic program is also directed towards related national goals as represented by more extensive recreation facilities that will benefit the underprivileged, food from the sea as a factor in the fight against hunger, and important contributions to our defense capabilities.

Because of the reasons we just stated and the ones cited earlier, we favor establishment of a National ocean agency at the earliest possible time.

The question has been raised by many as to whether or not an advisory committee should be set up at the same time as a National ocean agency. We believe that the two entities should be created simultaneously. However, the point has been made that political difficulties may unduly delay the creation or designation of a National ocean agency, which suggests that the advisory committee should then be permitted to be established prior to the agency.

On balance, OSTAC suggests that we not move too quickly to establish an advisory committee prior to a National ocean agency. We should try to get both established at the same time, whether created through Executive Order or by legislation, in order to reap the maximum advantages of the combination of an advisory committee, a National ocean agency and the Federal interagency mechanism. If an undue delay occurs in the creation of a National ocean agency, then we suggest taking action towards the establishment of a National advisory committee to be attached to the Executive Office of the President.

As mentioned earlier, OSTAC recommends that senior policy officials from key Federal agencies, as well as regional State representatives, should be requested to serve as non-voting participants on the advisory committee.

If the Federal members were included as full voting participants, they might be constrained in their official votes by Administration policy, i.e., they might personally feel one way but would be obliged to vote in accordance with their department's or the Administration's official position. Also, since one of its duties is to assess the performance of Government efforts, Federal voting representatives would in effect be asked to grade their own efforts. This situation arose with the Commission where the Government members abstained in voting upon the recommendations concerning Government organization.

However, the Commission did find it valuable to have Federal members available to inject their knowledge and experience without the necessity of being required to register a formal vote.

The State or regional representatives will be very important participants. However, as in the case of the Federal participants, we believe they can be most effective if they are not asked to vote on matters that might conceivably be in conflict with an official position of their State government.

Continuation of the Council

Pending determination of the question of organization of the Federal marine activities, it is suggested that the present Council remain in existence until its coordinating and related functions can be appropriately assigned to whatever mechanism is set up to handle a National ocean program.

Focal Point in the Congress

In OSTAC's original study submitted to Dr. Frosch and the Commission in the fall of 1967, we urged that "consideration be given by the Congress to the establishment of overall House and Senate Committees on Marine Sciences that would have the responsibility of reviewing and approving programs recommended by the new Executive Department mechanism and providing for proper budget-

ing within the overall budgets of the agencies assigned to execute the approved programs."

Accordingly, OSTAC was extremely pleased to note the section in the Commission's Report dealing with this question. We endorse the statement on page 247, that--

"Activities of the new agency now under the cognizance of several committees should, if possible, be the responsibility of a single legislative and appropriation committee in each house."

We also agree that the assignment of the Director of the National ocean agency to his second role of chairing the interagency mechanism would be very helpful to the Congress. As stated earlier, he would be able to testify with expertise on matters pertaining to all civilian marine programs. Finally, as the Commission points out, the biennial report to the public by the National advisory committee should provide the opportunity for a broad review by the Congress of the progress in achieving National marine objectives.

The Navy's Role in the Proposed Ocean Program

It can be anticipated with assurance that the Navy will continue to make major contributions to knowledge of the oceans and to ocean related technology as in the past. These contributions will have major value in the civilian sector and, by appropriate liaison with the agency responsible for civilian programs through the proposed Federal interagency mechanism, will continue to be a major factor in the overall national program.

Other Commission Recommendations

OSTAC does not at this time wish to comment on the recommendations in the Commission Report not related to Government organization except to emphasize that many of them are of the utmost importance to the Nation. OSTAC is, however, reviewing these other recommendations and is presently preparing a more detailed critique.

We suggest that a first step ahead for the Congress is to do what it can to expedite the implementation of a National advisory committee, a National ocean agency and the interagency mechanism. Once this is done, these groups can examine the Commission's program recommendations in greater detail, prepare a plan of action and provide detailed cost estimates for its pursuance. To make this examination and properly prepare a plan (with realistic costs) for the initial projects of an expanded National ocean program will require some time (it could readily require up to two years). During this period that will be required before the National advisory committee and an ocean agency can become fully effective, the expenditures for oceanic programs would be expected to be maintained near present levels, awaiting guidance from the advisory committee and the ocean agency to provide a sound basis for a future expanded program.

SUMMARY

We endorse the Commission's recommendations with respect to the need for the following:

(1) A National advisory committee for the oceans; however, its voting membership should come entirely from non-government entities. State and Federal representatives should be non-voting participants.

(2) A consolidation of certain key ocean functions and agencies of the Federal Government, although not necessarily the specific ones recommended by the Commission. (OSTAC did not have sufficient time to study this problem thoroughly.)

(3) Housing the proposed Federal consolidation in a National ocean agency.

(4) A Federal interagency mechanism, to be chaired by the head of the consolidated agency, to facilitate information exchange and to help insure the utilization of the capabilities of the Navy and other Federal agencies not in the designated National ocean agency.

(5) Continuation of the present Council until organizational recommendations are resolved.

(6) A focal point for civilian oceanic legislative and appropriation matters in each House of Congress.

(7) An independent staff for the National advisory committee, separate from the National ocean agency, if and when the agency is established.

OSTAC also offers the following observations:

(1) The creation per se of a National ocean agency at this time does not necessarily create new demands for funds from an already hard pressed Govern-

ment budget. Rather, it presents an opportunity to make more efficient use of funds already committed.

(2) An intriguing aspect of increasing our commitment to oceanic programs at this time is that it is essentially an investment and not an irreversible expenditure. With the private sector becoming increasingly involved, the returns to the Government through increased GNP with its associated increase in revenue from corporate and payroll income taxes, royalties, etc., should far exceed the "seed money" it would be expected to invest in the near term.

(3) As the Commission pointed out, a National ocean agency could readily be accommodated into any new fundamental Government reorganization in the Executive Branch, if such were desired at a later time.

(4) The National advisory committee should be created simultaneously with the setting up of a civilian marine oriented agency; however, if the designation of the Federal agency is long delayed, we should renew action toward creation of the advisory committee.

(5) The special competence of the Navy must be utilized in the future Government reorganization and in all future planning. We believe that the Commission did recognize this need by recommending the establishment of a Federal inter-agency mechanism and by assigning senior policy officials from key Federal agencies, such as the Navy, to serve as non-voting participants on the National advisory committee.

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AMOR L. LANE

Specialties: Over twenty years' experience in oceanographic applications, including use of underwater acoustics in antisubmarine warfare; oceanographic instrumentation; and analysis of industrial activities in National Ocean Program.

Present Occupation: Director of Marine Planning Activities, Washington Operations, American Machine & Foundry Company, 1701 K Street, N.W., Washington, D.C.

Residence Address: 9533 Lawnberry Terrace, Silver Spring, Maryland.

Birthplace, Date of Birth: Philadelphia, Pennsylvania; February 16, 1926.

Married: Anita Lane, two children.

Degrees, Honors and Awards: Four-year Scholarship to University of Pennsylvania; B.S. in Electrical Engineering from University of Pennsylvania, 1949; M.S. in Electrical Engineering from University of Pennsylvania, 1962; Navy Department Civilian Meritorious Award, 1953; AMF Achievement Award, 1964.

Honorary Fraternities: Tau Beta Pi, Sigma Tau, Eta Kappa Nu.

Publications: Numerous technical papers on underwater acoustic transducers and use of underwater acoustics for oceanographic and offshore petroleum applications; Editor of "Compilations of Industrial Oceanographic Capabilities," an NSIA Report, 1964.

Military Service: U.S. Navy June 1944–February 1946.

Professional Career (in reverse chronological order): August 1967–February 1969—Staff Member of the Commission on Marine Science Engineering & Resources: specialized in Government-Industry Roles and means for insuring continuing private sector inputs into the ultimate government organization to be recommended by the Commission. Staff member on the Panel on Marine Engineering and Technology and the Panel on Industry and Private Investment.

June 1961–July 1967—American Machine & Foundry Company, Alexandria, Virginia; Program Manager for Underwater Systems. Also served as Chariman of the Oceanographic Steering Committee for five of the AMF operating groups.

Previous Positions: Radio Corporation of America, Camden, New Jersey: Staff Member in Undersea Warfare Department; Technitrol Engineering Company, Philadelphia, Pennsylvania; U.S. Naval Ordnance Laboratory, White Oak, Maryland: Head, Ultrasonic Transducers Section, Torpedo Division.

Consultant to President's Science Advisory Committee Panel on Oceanography, 1965.

Professional and Industrial Societies—Membership and Activity.—National Security Industrial Association (NSIA): 1961–Present; National Security Industrial Association Ocean Science and Technology Advisory Committee (NSIA/OSTAC): Acting Chairman 1965; Chairman, OSTAC Executive Committee 1965–Present; Chairman, Second NSIA/OSTAC Government-Industry Continental Shelf Conference 1967; Chairman, Steering Committee NSIA–State of Oregon Sponsored Coastal States Conference 1968.

NSIA Antisubmarine Warfare Advisory Committee: Member, Planning Committee and Chairman, Oceanography Subcommittee, 1964–1966.

Marine Technology Society, Inc. (MTS): Vice President for Publications and Member of MTS Council, 1966–1969.

Institute of Electrical and Electronics Engineers (IEEE): Group Activities—Group on Sonics and Ultrasonics, Organizer and First Chairman 1953–1955, Member 1953–Present; Group on Geoscience Electronics, Member 1965–Present.

STATEMENT OF BRAXTON B. CARR, PRESIDENT, THE AMERICAN WATERWAYS OPERATORS, INC.

The American Waterways Operators, Inc. (AWO) is the national trade association representing the barge and towing industry. Members of AWO operate towing vessels and barges, build and service such equipment and provide terminal services for waterborne commerce through the United States. The Association's executive office is located at 1250 Connecticut Avenue, Suite 502, Washington, D.C. 20036.

This statement is presented by Braxton B. Carr, president of The American Waterways Operators, Inc., under authorization given by resolution of the Association's Board of Directors at a meeting held September 11, 1969 at Jacksonville, Florida.

As one of the nation's developed and growing modes of transportation, the barge and towing industry has an interest in the overall proposition to establish a National Oceanic and Atmospheric Agency. Most particularly with respect to the bill under consideration to establish such an agency, AWO has an interest in the proposed transfer of the United States Coast Guard from the Department of Transportation to the new agency under terms of the bill.

The barge and towing industry is dependent upon the Coast Guard for a multitude of services, all designed to insure the safety of operations for this mode of transportation. The Coast Guard's work in this respect covers a broad spectrum of essential transport services: (1) to safeguard personnel working aboard towing vessels and barges while in transit and during certain barge loading and unloading operations; (2) to safeguard the vessels themselves; (3) to safeguard the cargoes of certain barges, particularly tank barges, to insure against their loss as a protection to the personnel working aboard such vessels, at terminals, and the general public where the public might be affected by flammable, combustible, explosive, toxic and/or poisonous cargoes; and (4) to safeguard structures alongside, over and under waterways and adjacent shore lines.

The importance of this mode of transportation is demonstrated by the fact that domestic waterborne commerce represents 20 percent of total U.S. commerce, with barges performing 11½ percent of total U.S. commerce. While we

are speaking directly to the point of the barge and towing industry's interest in the transportation support services rendered by the Coast Guard, these services are rendered with respect to all domestic waterborne commerce.

AWO believes that the nation's domestic marine transportation services will be best served by leaving the United States Coast Guard in the Department of Transportation where the total mission of the department is directed toward improvement of the transport network as a whole, using the facilities of other agencies within the Department in addition to the Coast Guard. Transfer of the Coast Guard to the National Oceanic and Atmospheric Agency inevitably would reduce the Coast Guard's services in the transportation field in relationship to the other interests it would have in the new agency. Where the priorities of the Coast Guard's work are now directed primarily to transportation services, this would not be the case in the Coast Guard's role within the new Oceanic and Atmospheric Agency. The priorities would change so as to inevitably downgrade Coast Guard work in the field of transportation. For this reason, The American Waterways Operators, Inc. urges against the proposed transfer.

The downgrading of the Coast Guard's priority for services to marine transportation would affect certain functions which we believe should be called forcefully to the attention of this subcommittee in this consideration of the proposed transfer.

Great public concern has been expressed, and rightly so, with respect to the transportation of certain hazardous and dangerous cargoes, primarily liquid cargoes which are flammable, combustible, explosive, toxic and/or poisonous. Many millions of tons of such commodities are moved in bulk in barges over the inland waterways and over the coastal waterways of the United States. Similarly such cargoes are moved by rail and by truck. The Coast Guard formulates and administers rules and regulations governing such transportation by tank barge and tank ship. These rules and regulations govern the specifications for the construction and operation inspection of such tank vessels. In certain instances they govern operational procedures. They govern the requirement for licensed personnel to handle the loading and and unloading of such commodities.

It should be of interest to this committee to note that the marine transport industry, including the barge and towing industry, is the only mode of transportation that today has a well-developed and functioning system of safety control for the transportation of flammable, combustible, explosive, toxic and/or poisonous commodities. The reason for this is that the Coast Guard and the marine transport industry, working closely in cooperation with each other, recognized many years ago that a system of safety control was essential. And the Coast Guard working in cooperation with the industry developed an acceptable system which has worked extremely well. Anything which would tend to diminish or dilute the Coast Guard's primary mission of transport services would inevitably be reflected in diminished work, interest, expertise, and knowledge in this most important safety activity, an activity which is not only of importance to the marine transport industry itself but to the general public welfare.

The Coast Guard is responsible for formulating and administering Rules of the Road which govern the operation of marine vessels. These Rules of the Road not only govern the physical handling of vessels, but establish procedures for the lighting of vessels for recognition purposes during the periods when such vessels are in motion, when tied up, or at anchor. These rules govern moorings and anchorings to insure the safety of persons and property, both with respect to the moored and/or anchored vessels as well as other vessels that will be navigating in the vicinity.

The Coast Guard is responsible for placing and maintaining aids to navigation in order to insure safe operation of vessels. The agency at this time maintains over 44,600 such aids to navigation, approximately 24,000 of which are buoy markers on the inland waterways of the United States which serve as aids to both commercial vessels and pleasure craft. These inland channel buoys together with lighthouses, off-shore platform stations, lighted ships, radio-beacons, fog signals, day beacons, and long-range electronic aids are all primarily transportation services performed by the Coast Guard.

The Coast Guard's ice breaking responsibilities on such inland waterways as the Hudson River, the Upper Mississippi River, the Missouri River, Chesapeake Bay, the Potomac River, the Illinois Waterway, and in certain other areas are all essential transport service functions.

The Coast Guard has proposed to the Congress that legislation be enacted which would require VHF radiotelephone equipment aboard vessels as another aid to insure safe navigation. The administration and enforcement of this program, when the statutory authority is established by the Congress, will be a new responsibility in the field of transport services for the Coast Guard.

As an agency responsible for the formulation and administration of safety regulations governing the operation of vessels the Coast Guard has the added responsibility to investigate marine casualties. Such investigations, among other things provide information for use by the Coast Guard in improving the agency's work with respect to transport safety functions.

When the Coast Guard was transferred from the Treasury Department to the Department of Transportation in 1966, the agency was given the responsibility to make the determination with respect to the location and plans for bridges and other structures to be built across or adjacent to navigable waterways in order to determine their suitability from the standpoint of maintaining navigation. This is an important transport service function inasmuch as overhead structures across navigable waterways can create a limiting dimension if they do not provide adequate clearances.

One final point should be noted in any consideration of a change in status of the Coast Guard which would relegate its transport service functions to low priority. That point is the comparative data on fatalities with respect to modes of transportation. Fatality rates are one measure of the efficiency of safety control systems such as the control system exercised by the Coast Guard for marine transport services. For the year 1966 the motor carrier industry experienced 10.77 fatalities per billion ton miles of truck transportation. The railroads experienced 2.64 fatalities per billion ton miles of railroad freight service. The barge and towing industry experience 0.274 fatalities per billion ton miles of freight service. This record speaks well for the Coast Guard's role as the nation's safety coordinator and administrator of marine transport services and should constitute a high recommendation to have the agency retain its priority in this field of work.

The American Waterways Operators, Inc., believes that the Coast Guard should remain in and continue to operate within the Department of Transportation where the nation's major policy decisions for the various modes are made and where priority is placed on transportation services such as the barge and towing industry relies upon the Coast Guard to perform. We repeat: transfer of the Coast Guard to the proposed new National Oceanic and Atmospheric Agency would inevitably relegate these transport service functions to low priority.

In view of this, AWO believes the transfer of the Coast Guard, as proposed in H.R. 13247, is not in the public interest, and, in fact, very well might be detrimental to the national transportation interests.

STATEMENT OF JACOB BLAUSTEIN, CO-FOUNDER AND FORMER PRESIDENT, AMERICAN OIL CO.; DIRECTOR, STANDARD OIL CO. (INDIANA); FORMER U.S. DELEGATE TO THE UNITED NATIONS—COMMENTING AS AN INDIVIDUAL AND NOT IN BEHALF OF THESE ORGANIZATIONS

Mr. Chairman and members of the subcommittee, I appreciate the invitation to submit this statement to this distinguished subcommittee to comment upon the report of the Commission on Marine Science, Engineering, and Resources, and to have this opportunity strongly to endorse the enactment of H.R. 13247. Enactment of this proposed legislation is the single, most important step which must be taken to prepare this nation in the decades ahead to make full and wise use of the surrounding seas. In my judgment, the nation's needs and opportunities in relation to its marine environment are of such priority that action to establish a National Oceanic and Atmospheric Agency (NOAA) would be remembered as one of the outstanding achievements of the 91st Congress.

As with several other of our Commission members, I had had no special training or involvement in marine affairs prior to being asked by the President in January, 1967, to participate with his Commission in a searching appraisal of our nation's marine interests and activities. As an oil man, I had noted our growing dependence upon offshore sources to meet accelerating needs for energy fuels and had been impressed by the industry's technological virtuosity in operating in this new environment.

Through my industry's transport activities, I was at least aware of the explosion then occurring in the capacity of ocean-going tankers, of their requirements for improved port facilities, and of the significance which sharply lower costs might have for our industrial economy. Also, in long association with United Nations' activities, I had learned that other nations shared our interests in the seas and that whatever programs were organized to develop marine resources beyond the limits of national jurisdiction must recognize these multiple interests. Moreover, during our studies as members of the Marine Commission, I was co constantly impressed by the diversity and long-term significance of this nation's stake in the uses of the sea.

I believe that the range of national interest, and the implications which this condition have for national policy, were well expressed by the Commission in its report:

"Like the oceans themselves, the Nation's marine interests are vast, complex, composed of many critical elements, and not susceptible to simplicity of treatment. Realization and accommodation of the Nation's many diverse interests require a plan for national action and for orderly development of the uses of the sea. The plan must provide for determined attack on immediate problems concurrently with initiation of a long-range program to develop knowledge, technology, and a framework of laws and institutions that will lay the foundation for efficient and productive marine activities in the years ahead. Although the Commission has addressed its proposals principally to the Federal Government, the States, the scientific community, industry, and others will need also to exercise initiative in their respective areas and participate fully in order that there may be a genuine national effort."

And in concluding its proposed plan for national action:

A time for decision is here. Multiple pressures force the Nation to turn to the sea, and multiple opportunities await the seaward turning . . . The ocean does not yield its food and mineral treasures easily; damaged environments are not restored by scattered attacks or the good intentions of a few; the planet's dominant element cannot be understood, utilized, enjoyed, or controlled by diffuse and uncoordinated efforts. The Nation's stake can only be realized by a determined national effort great enough for the vast and rewarding task ahead.

Now to several specific points:

The first point I should like to make is that the urgency of action *now* is real. It was not simply happenstance that a Commission on Marine Science, Engineering and Resources was formed in January, 1967, or that legislation to establish a national marine and atmospheric program should be on the congressional agenda two years later. The proposal for a National Oceanic and Atmospheric Agency grows out of more than a decade of expanding knowledge and use of the seas. Offshore development both here and abroad is proceeding apace. The land along our shores already is almost entirely committed to patterns of use which will be increasingly difficult to adjust to broad public interests. Pollution has already engulfed one of our Great Lakes and threatens others. The time for action is now. If deferred, it seems all too likely that we shall be condemned to another decade of study and delay.

The Marine Commission recognized that times of adoption of the several elements of its proposed program would have to be considered in the context of overall national priorities. However, we concluded also that immediate action could and should be taken on our proposal for government reorganization. It will involve little or no incremental cost. By drawing together closely-related activities, it can improve administrative decision-making, provide a sounder basis for public and private investments, and lend strength and power to the nation's commitment to the seas.

The second point I would like to emphasize is the Commission's concern that our marine program be truly national in scope and involve industries, universities, and state and local governments in a concerted effort to increase capabilities and to make more effective use of the seas. Federal leadership will be needed in order to give direction and stimulus to this broad base of activity. But the doing itself—the work of our scientists and engineers and of our great corporations in developing the sea's resources—must inevitably be undertaken chiefly through private institutions, with public interest in mind.

The Commission visualized a National Oceanic and Atmospheric Agency as a focal point to such activity. Also, recognizing the paramount importance of harmonizing NOAA's programs with non-Federal activities and needs, the Com-

mission recommended the establishment of a National Advisory Committee for the Oceans. I am happy to see that H.R. 13247 would establish both of these agencies. They are intended to complement one another and should be established concurrently.

Third, may I refer to the National Projects recommended by the Commission. Specific projects are identified at page 38 of our report. I feel that it will be important for the new marine agency, when established, to be mandated to undertake a limited number of concrete, definable activities which both offer promise of immediate reward and push forward the existing state of the art. The execution of the National Projects would mobilize a broad range of scientific and engineering talents in tasks which should gain wide public support and attention. I believe that American industry would also participate enthusiastically in the National Projects, which have been selected so as to offer practical pay-outs in developing capabilities in fields in which there are broad industrial interests but whose development lies beyond the resources of individual firms.

Ocean exploration sometimes is compared with space exploration. The two environments of course present quite different problems and our motives for effort in the two fields are almost wholly dissimilar. Yet we have learned in our space program the value of establishing a few, challenging targets as foci for the nation's interest. A very small proportion of the resources applied to our landing on the moon, or prospectively to be applied to the exploration of Mars, would permit the initiation of both a dramatic and a useful program of National Projects in the sea.

Finally, I personally have been particularly concerned that, as phrased in Public Law 89-454, "the marine science activities of the United States . . . be conducted so as to contribute to . . . the cooperation of the United States with other nations and groups of nations and international organizations" (section 2(b)(8)). In the conflict-ridden world of today, I consider it essential that we seize every opportunity to nurture the common interests which we share with other nations. Together with my fellow-commissioners, I have strongly supported the International Decade for Ocean Exploration. I believe it very important also that commercial exploration and exploitation of the sea's resources proceed within an orderly framework of international law. The Commission's recommendations in this area have proved controversial. This is to be expected. But the existence of divergent interests in my view simply highlights the importance of coming to some agreement within this country and with our neighbors abroad as to what principles are to apply in future years as industrial development presses out into the area of present legal uncertainty.

In holding these hearings, Mr. Chairman, I believe that your subcommittee is performing a great service to our nation. Our marine industries and research institutions await a sign that the Federal government recognizes the importance of the nation's marine interests and is prepared to make the necessary investment to safeguard our position as a great sea-nation. I firmly believe that a full review and public discussion of the stakes involved, such as has been undertaken by this subcommittee during the past six months, will bring the Congress and the nation as a whole to the same conclusion as that which we reached within the Marine Commission—that the *time for decision is now* and that the nation's stake in the seas can be realized only through a determined national effort great enough for the vast and rewarding task ahead. Thank you.

STATEMENT BY DR. GLENN T. SEABORG, CHAIRMAN U.S. ATOMIC ENERGY COMMISSION

Mr. Chairman, I appreciate the opportunity to present the views of the Atomic Energy Commission on the report of the Commission on Marine Science, Engineering and Resources entitled "Our Nation and the Sea."

The Marine Commission's analysis of benefits to be derived from more effective use of the sea is thorough and realistic. Its recommendations merit and will receive our careful attention during consideration of AEC programs and priorities. The recommended reorganization of Federal marine-related activities, centered around the establishment of a new independent agency, would draw together ocean-related functions and organizations from several existing departments and agencies and needs to be examined carefully in the broad context of Federal organization and program priorities. In its analysis of the proposed

reorganization, the Marine Commission rejects the idea of consolidating all Federal marine and atmospheric functions into a single organization. We agree that certain marine- and atmospheric-related programs are integral to the mission of the agencies performing them and that these are best left where they are.

The Report includes recommendations regarding (1) thermal pollution legislation, (2) submerged nuclear power plants and (3) the development of power systems for undersea operations and resource development. My comments on these recommendations, each of which bears directly on AEC programs, are set forth below.

1. THERMAL POLLUTION LEGISLATION

The Marine Commission observes that the Department of Justice has agreed that the AEC lacks authority to consider thermal pollution as part of its licensing procedures. (More recently, this view was upheld in *State of New Hampshire v. Atomic Energy Commission et al.*, 406 F.2d 170, *cert. denied*, 37 U.S.L. Week 3481 [U.S. June 16, 1969].) With this in mind, the Marine Commission recommends "that legislation be enacted to enable the AEC to consider the environmental effects of projects under its licensing authority." (page 77) The Atomic Energy Commission already has, and vigorously exercises, broad authority to consider environmental effects of radiation and radioactivity in licensing. Also under AEC's developmental authority, as distinguished from its regulatory functions, we have been conducting studies on environmental effects of thermal discharges. We strongly support the need for such studies as a basis for establishing controls on thermal pollution.

Legislation along the lines recommended by the Marine Commission would address only a portion of the problem of thermal discharges produced by steam electric power plants. All such plants, whether employing nuclear or fossil fuels, must discharge heat into the environment and the AEC does not believe that legislation limited to nuclear plants in an effective way to deal with the problem.

Provisions for control of thermal effects along the lines favored by the AEC are contained in H.R. 4148 entitled, "Water Quality Improvement Act of 1969," which was recently passed by the House. Similar provisions are contained in a Senate bill (S. 7) introduced by Senator Muskie and currently under consideration. The approach of these bills is consistent with the provisions of the Federal Water Pollution Control Act which assigns primary responsibility for control of water pollution to the states. It would require applicants for federal licenses to obtain advance certification from the appropriate state or interstate water pollution control agency that the proposed activity will comply with applicable state water quality standards. Failure to provide such certification would preclude issuance of the federal license. Since all nuclear power plants and probably most of the nonnuclear power plants of similar size would require a federal license or permit of some sort, these bills would establish an effective and equitable procedure to cope with the total problem of thermal effects and their control.

2. SUBMERGED NUCLEAR PLANTS

The Marine Commission report discusses the siting of nuclear power plants and recommends collaborative efforts involving the proposed National Oceanic and Atmospheric Agency and the AEC. In particular, the Marine Commission recommends support for the development of technology for and construction of "an Experimental Continental Shelf Submerged Nuclear Plant . . . to pilot test and demonstrate the economic and technical feasibility of . . . the underwater siting of nuclear facilities to provide power for coastal regions." (page 162)

There are several ways of obtaining the ecological advantages of ocean siting in addition to submerging reactors. These include coastal siting, island siting and floating stations. AEC investigations of off-shore siting for large nuclear power plants make clear that submerging such large commercial facilities on the continental shelf is, at this time, several steps ahead of current state of the art from both an engineering and an economic standpoint. As a result, the AEC has directed its attention toward the use of existing islands, or the construction, in water depths of 20-60 feet, of man-made islands upon which the plant facilities could be located. Many of the advantages noted by the Marine Commission for submerged plants can be obtained by off-shore siting on islands with fewer technical difficulties and with far less economic penalty than would be associated with a submerged plant.

We believe that during the next few years efforts should be focussed on the following:

- (a) detailed study of the environmental and nuclear safety advantages which can be obtained from island siting;
- (b) consideration of various engineering approaches to the construction or use of islands, including the trade-offs that could improve the economics of island siting as compared with typical on-shore siting;
- (c) identification of legal and other encumbrances associated with island siting; and
- (d) demonstration of island siting, incorporating features leading to an ecologically acceptable design.

The Bolsa Island Nuclear Power and Desalting Plant project in southern California was designed to demonstrate the technological and economical feasibility of siting nuclear power plants on man-made islands. However, this project has been terminated and a suitable alternative demonstration of island siting has not yet been identified. As I have indicated above, preliminary studies of submerged sites for nuclear plants on the continental shelf have been completed. Some continued investigation of the technological aspects and comparative economics of this concept is contemplated, but no major AEC program effort on this subject is underway or planned at this time.

(3) DEVELOPMENT OF POWER SYSTEMS FOR UNDERSEA OPERATIONS AND RESOURCE DEVELOPMENT, INCLUDING NUCLEAR SYSTEMS

The Marine Commission recommends support by the proposed National Oceanic and Atmospheric Agency for "technology development of power systems necessary for undersea operations and resource development." (page 162)

In the March 1968 report of the National Council on Marine Resources and Engineering Development to the President, the absence of reliable and self-sustaining power sources is identified as "Perhaps the most critical, unmet need of underwater technology . . ." (page 151) The Marine Commission report accurately recognizes that the needs for reliable and self-sustaining power cannot be met by any one single type of power source for all power level, endurance and ambient pressure requirements associated with present and prospective undersea tasks. Present technological capability with respect to self-sustaining undersea power sources has been demonstrated to be inadequate to meet the requirements of many possible undersea missions and tasks. Without effective, reliable power sources, such missions cannot advance far beyond the concept stage.

Since 1962 the AEC has, in keeping with its statutory responsibilities with respect to the peaceful applications of nuclear energy, pursued the development of self-sustaining and long-lived nuclear power sources for undersea and marine applications. The unique characteristics of nuclear reactor and radioisotope power sources in terms of their endurance capability, reliability, compactness and environmental capability are such that these characteristics may be profitably applied to meeting a large portion of deep ocean applications and tasks.

Current AEC efforts involve the design, development and demonstration of radioisotope sources at electrical power levels up to 100 watts. This emphasis is to meet projected near-term applications involving ocean experimentation and exploration which, in general, will require long-endurance, low-power sources. Plans have been established to initiate the development of both large radioisotope sources (1-10 kilowatts) and oceanographic reactor sources at power levels of several hundred kilowatts that are being projected for manned undersea stations and other large oceanographic and continental shelf installations. This prospective need is, not, however, nearly as well defined nor close at hand as the need for low-power sources to warrant expenditure of AEC's very limited resources. These latter programs will involve an extensive long-term research and development effort on the part of the AEC.

In summary, the AEC believes that legislation along the lines of H.R. 4148 and S. 7 is desirable. Island siting of nuclear power plants appears more promising than submerged siting. We believe the development of suitable power sources is essential if undersea missions are to be accomplished, and plan to continue to work closely with other agencies in identifying possible priorities for the development of nuclear power sources for ocean missions.

STATEMENT OF SCOTT H. ELDER, GENERAL COUNSEL, LAKE CARRIERS' ASSOCIATION

This Bill would amend the Marine Resources and Engineering Act of 1966 (33 U.S.C.A. §§ 1101-1108) to establish an independent agency to be known as the

National Oceanic and Atmospheric Agency, the primary mission of which could be to establish a comprehensive and long-range national program of research development, technical services, exploration and utilization with respect to the marine and atmospheric environment. To this agency would be transferred from the Department of Transportation, the United States Coast Guard. In essence, the Coast Guard would become the major component upon which the new agency would be grounded.

As an association of vessel companies engaged in the transportation of bulk commodities upon the Great Lakes, we certainly are not opposed to any scientific endeavor which will bring about greater utilization of our marine and atmospheric environment. We do seriously question, however, the advisability of diffusing the present-day functions of the Coast Guard by transferring it from the Department of Transportation to a new Oceanic and Atmospheric Agency. H.R. 13247 makes the assumption that all marine endeavors can or should be concentrated in a single agency irrespective of the nature of those endeavors. This we do not believe to be true, and the Coast Guard is a case in point.

Lake Carriers' Association is an organization comprised of 19 vessel companies owning and operating 198 bulk cargo vessels, all of which are of United States flag. The vessels of Association members transport nearly all of the bulk commodity commerce on the Great Lakes which moves by American flag vessels. In order to appreciate the magnitude of bulk commodity transportation on the Great Lakes, it is only necessary to point out that last year the Great Lakes bulk commodity movement totaled 204.8 million tons, comprised mainly of the commodities iron ore, coal, grain, limestone, sand, gravel, cement and petroleum products.

The bulk commodity movement, so essential to the industry of the Great Lakes region, could not be accomplished without the services of the Coast Guard. That service contributes immeasurably to the rapid turn-around of the vessels, not only because of the excellent way in which they maintain aids to navigation and assist our vessels through ice in fall and spring, but also because of the cooperative manner in which they exercise their regulatory powers. The United States Coast Guard has always indicated a willingness to coordinate their activities and responsibilities in such a way as to maintain vessel operations, thus assuring the continued movement of bulk cargoes without unnecessary delay.

As indicated by the Act of August 4, 1949 (14 U.S.C.A. § 2) as amended by the Act of October 5, 1961, the primary duties of the Coast Guard are:

1. To enforce or assist in the enforcement of all applicable Federal laws upon the high seas and waters subject to the jurisdiction of the United States;
2. To administer laws and promulgate and enforce regulations for the promotion of safety of life and property on the high seas and waters subject to the jurisdiction of the United States;
3. To develop, establish, maintain and operate, with due regard to the requirements of national defense, aids to maritime navigation, ice-breaking facilities, and rescue facilities for the promotion of safety on and over the high seas and waters subject to the jurisdiction of the United States;
4. To engage in oceanographic research on the high seas and in waters subject to the jurisdiction of the United States; and
5. To maintain a state of readiness to function as a specialized service in the Navy in time of war.

Since its inception, the multiple missions of the Coast Guard have been primarily transportation-oriented. Basically, the Coast Guard's responsibilities are enforcement of all federal laws on waters to which they have application, safety of life and property at sea, aiding navigation and readiness to function with the Navy. These various interdependent functions all relate to ships and shipping in one way or another. It was not until the Act of October 5, 1961 that the Coast Guard was given any responsibility in connection with oceanographic research. The legislative history of that Act (Conference Report No. 1194: U.S. Code Cong. and Adm. News, Page 3339) indicates that the Coast Guard was to conduct oceanographic research using necessary equipment or instruments and analyzing oceanographic data in cooperation with other agencies of the government, or not, as the Secretary of the department in which the Coast Guard is operating determines to be in the national interest. Thus, the Congress at that time was conscious of the need for safeguards to prevent a dilution of the traditional missions of the Coast Guard, and it achieved this by requiring that the Secretary of the department in which the Coast Guard is operating make the final determination as to public interest.

The Coast Guard, like every other federal agency, does not operate with an unlimited budget. Our apprehension is that the new Oceanic and Atmospheric Agency will be so scientifically oriented and so bent upon environmental studies that the traditional missions of the Coast Guard, which it has carried out so well, will be neglected and possibly even abandoned. Our apprehensions in this respect are not unfounded.

The Oceanic and Atmospheric Agency would be completely independent of any of the existing departments of the executive branch of the Government. The report of the Commission on Marine Science, Engineering and Resources states that as an independent agency a freedom of action would be achieved which is difficult to obtain within an existing department. The report further indicates that the new agency would be composed of organizational elements concerned primarily with scientific, technical and service functions necessary for expanding planned use of the sea and its resources. The primary mission of the new agency would be to insure the full and wise use of the marine environment. Thus, it is clear that primary emphasis would be placed upon advancing the marine and atmospheric sciences.

Concerning the Coast Guard's role in the proposed new agency, the report of the Commission on Marine Science, Engineering and Resources (Page 237) assumes that only in Merchant Marine safety and inspection are the tasks of the Coast Guard solely related to transportation. The report admits (Page 238) that the needs of marine users, in addition to those of the Merchant Marine, often strain the facilities of the Coast Guard. Nevertheless, the report asserts that "changes in the Coast Guard and its mission should be encouraged and accelerated by bringing it within the framework of the national ocean program to be lead by NOAA." The basic point the report attempts to make is that within a national oceanic and atmospheric agency the Coast Guard could be used to a much greater degree in a more broadly gauged role than is possible within a solely transportation context, and "that this can be achieved without curtailing its important transportation functions." On this basic point we strong disagree.

The report of the Commission on Marine Science, Engineering and Resources (Page 237) makes an analysis of Coast Guard activity, the conclusion of which is that while most Coast Guard activities relate to transportation, they are similarly related to other uses of the sea. While it is probably true that provision of aids to navigation, which require 28 per cent of the agency's budget, is critical to the whole span of marine activities, it is essentially a service to shipping. Ice breaking, which the report classifies with oceanography, meteorology and other marine sciences, is essentially a service to commercial shipping and only incidentally related to the marine sciences. The Coast Guard is engaged in many diversified fields, but nearly all of its activities; namely, ice breaking, ice patrols, search and rescue, aids to navigation, vessel inspection, port security and certification of Merchant Marine personnel, relate to shipping.

When an organization such as the Coast Guard is performing multiple missions, priorities have to be established. The Commission on Marine Science and Engineering Resources would encourage and accelerate changes in the Coast Guard and its mission, despite the fact that the facilities of the Coast Guard are already often overstrained. It could not be clearer that under an independent agency such as that proposed by H.R. 13247, the transportation-related functions of the Coast Guard would have a low priority.

Our Government is based on a system of checks and balances. When the legislation authorizing the Coast Guard to conduct oceanographic research was enacted in 1961, it was evident from the legislative history of the Act that oceanographic research was not intended to interfere with or take priority over other functions of the Coast Guard. Under present law, the Secretary of the department in which the Coast Guard is operating determines the extent to which the Coast Guard is to conduct oceanographic research, in the national interest, in cooperation with other agencies of the Government. Thus, the Secretary of Transportation is permitted to exercise his discretion so as to assure that the missions of the Coast Guard, directly affecting transportation and the Department of Transportation, will not be neglected.

We recognize that there is a need for greater research in the marine sciences. We believe that the objectives of the proposed National Oceanic and Atmospheric Agency are meritorious and worthwhile. We do not believe there is any necessity, however, for transferring the Coast Guard to the new agency. There is already ample authority in law for the new agency to utilize the facilities of the Coast Guard, even though the Coast Guard is operating in the Department of Transportation.

For these reasons, we earnestly urge that in the event H.R. 13247 is enacted, the Coast Guard not be transferred to the new National Oceanic and Atmospheric Agency.

STATEMENT OF DR. THOMAS D. BARROW, PRESIDENT, NATIONAL OCEANOGRAPHY ASSOCIATION

My name is Thomas D. Barrow. I am president of the National Oceanography Association and am appearing before you today in that capacity to present the consensus viewpoint of the board of directors of that organization on H.R. 13247. I am also an active member of several other oceanography organizations and am a senior vice president and director of Humble Oil and Refining Company, Houston, Texas.

The National Oceanography Association appreciates the opportunity to appear before the subcommittee to comment on H.R. 13247. As you know, the National Oceanography Association is a citizens' organization representing industry, science, education and the general public desiring a strong national ocean program. We have approximately 500 corporate members which makes us the largest and broadest industrial-based oceanographic group. We also have some 1,700 individual members. For the record, I would like to submit as Exhibit I a brochure listing our board of directors and their affiliations.

Last May 22, 1969, then NOA president John H. Clotworthy appeared before this subcommittee to comment on the report of the Commission on Marine Science, Engineering and Resources and to express the association's support for the National Oceanic and Atmospheric Agency as recommended by the Commission. His statements were based on a resolution adopted on January 27, 1969, by the NOA board of directors approving the concept of both NOAA and NACO.

On September 18, the NOA board of directors adopted a further statement of position. This statement, as do my other comments, reflects the consensus of opinions of our collective board for which I appear and am testifying today. The views expressed are those of NOA and are not necessarily those of any one director or company represented on NOA's board, I will not read this statement but attach it as Exhibit II.

The National Oceanography Association policy statement recognizes the need for a central agency in government to undertake and oversee innovative oceanic and environmental activities which are appropriate to government. Such an organization is essential to efficiency and the elimination of duplication of effort. H.R. 13247 and the report of the President's Commission on Marine Science, Engineering and Resources are both devoted to this end and are therefore in this principle endorsed by the National Oceanography Association. We also specifically support the establishment of a National Advisory Committee for Oceans and Atmosphere.

The Stratton Commission has been highly commended by NOA (and others) for the thoroughness of its review and the high professional quality of its report to the President. Its basic concepts are embodied in the declaration of policy and objectives of H.R. 13247, where it is stated that the policy of the United States is to "encourage, develop, and maintain a comprehensive, coordinated and continuing national program in marine and atmospheric science, technology, and technical services for the benefit of mankind. . . ." We think that this is an important delineation of the scope of the proposed law.

Essentially, H.R. 13247 is concerned with the organization of government to conduct research and development activities and provide broad-based user services. As such, that instrument should properly be devoted to organizing the functions of government which are pertinent to government activity. It should not be a device to inject government into the historic activities of private enterprise. Certainly this bill could not obtain the widespread support of industry which it deserves if it were to violate the legitimate functions of private industry.

We believe that in two important respects it does that. In section 104 describing "Functions of the Agency", paragraph (a) (6) and (7) the NOAA is directed to explore and evaluate the living and mineral resources of the ocean environment and to develop hardware essential to that end. This, clearly, is an activity best performed by private industry. We, therefore, suggest that section 104, paragraph (a) (6) and (7) be revised so as to read as follows: (our suggested revisions underlined) "*encourage private enterprise to make surveys to identify, locate, and measuring living and mineral resources of the marine environment;*"

and part (7) to "encourage private enterprise in the exploration of the marine environment, including the development, construction, testing and operation of vehicles and associated equipment;"

Within government, the essential function of a lead agency to conduct the national oceanic and atmospheric program should be to organize and coordinate activities devoted to the advancement of mankind's knowledge and operational capability in the ocean spaces and environment. We concur in the Stratton Commission's conclusion that "the new agency should be composed of organizational elements concerned primarily with scientific, technical and service functions necessary for expanding planned use of the sea and its resources, for monitoring and predicting the total air-sea environment, and for exploring the feasibility and consequences of environmental modification." This statement is as important for what it does not include in the NOAA as for what it does include. It would properly vest the agency with a focus of purpose on expanding the frontiers of knowledge.

However, we believe it was not the intent of the Stratton Commission nor does it appear to be the intent of H.R. 13247 to transfer to the agency all of the Federal Government's oceanographic affairs. We believe that careful consideration should be given to the principle espoused by the Commission of separating the innovative research, development and services activities from the management of statutory law and the regulation of commerce in the ocean spaces. We think this distinction should be noted and preserved, and that, generally, the regulation of commercial activity should remain the responsibility of the government agencies already charged with those responsibilities.

It is not NOA's intent to give the impression that we are experts in either government organization or reorganization. We are not. However, many of us have had experience in the organizational structures of business enterprises and the problems accompanying any reorganization. We have found that there is no final ultimate organizational format, but that it must continually be adjusted because of external developments. We have also found that at any one moment of time, there are innumerable considerations concerning the location, mix, and timing for a reorganization. We make our decisions based on the confidence that the long-term gains offset the short-term costs.

The NOA joins the Stratton Commission and this subcommittee's belief that ocean activities deserve a higher priority on the Nation's agenda. There is still the acknowledged vital need today for a grouping of major civilian oceanic functions and we do not consider it necessary to await the results of the report of the President's Advisory Council on Government Organization to see how oceanography fits into the broad context of the Federal organizational structure. NOAA, as contemplated in H.R. 13247, can certainly be made a component of whatever broader reorganization may be ultimately achieved.

In conclusion, Mr. Chairman, I would like, on behalf of NOA, to thank you and the members of the subcommittee for allowing us to present our views on this important bill.

THE NATIONAL OCEANOGRAPHY ASSOCIATION

A CITIZENS' ORGANIZATION FOR A STRONG NATIONAL OCEAN PROGRAM
REPRESENTING INDUSTRY, SCIENCE, EDUCATION AND THE GENERAL PUBLIC

Purpose

The American public has a great stake in the optimum multiple uses of the oceans. For example, our national security, supply of mineral resources, recreational opportunities, availability of low-cost protein from fish, quality of coastal and Great Lakes' environments, knowledge about the earth's formation and improved weather forecasting will all be affected by the strength of our national ocean effort.

The National Oceanography Association's purpose is to encourage development of a strong national ocean program to realize the potential of the seas. A strong national program will have maximum participation by private enterprise, appropriate governmental support and scientific and academic participation.

The association, with its varied educational and legislative programs, fills the oceanography community's need for a national voice representing a cross-section of interests.

Program of action

Association activities reflect its broad composition. The NOA program concentrates on these principal areas:

Educational.—NOA serves as a national clearinghouse for oceanographic information for:

- Students and teachers—NOA publishes curricula and scholarship information and material helpful to persons interested in exploring oceanography as a career field.

- The general public—NOA has distributed thousands of Oceanography Information Kits. The monthly *NOA News* containing information on industrial and government activities of general interest is distributed to members, major newspapers, scientists, Members of Congress and other opinion leaders.

- News media—NOA encourages expanded coverage of oceanographic developments as a direct sponsor, as a source of data about the oceanographic community and by bringing oceanographic activities to the attention of editors.

- Businessmen—Periodic legislative bulletins pinpoint Washington events of significance.

Legislative.—NOA encourages appropriate governmental action to promote the interests of industry and the general public by:

- Conferences with top government leaders to exchange ideas and views.
- Testimony before congressional committees.
- Development of positions on major questions through NOA committees.
- Distribution of questionnaires to members on national questions.
- Reports on legislative matters to the members so that they may take action.

National Voice.—NOA provides individuals and firms interested in promoting oceanography a means of making their views known to each other, to the public and to elected officials in such areas as: government reorganization, international law, education and manpower, fisheries, offshore petroleum, civilian technology and national defense.

The association

The National Oceanography Association was incorporated in 1966 in the District of Columbia as a nonprofit corporation and is tax-exempt under section 501 (c) (6) of the Internal Revenue Code.

NOA is a citizens' organization whose membership and board of directors include representatives of industry, science, educational institutions and the general public. Policy is determined by the board of directors and implemented by the staff headed by the executive director in the association's Washington, D.C. office.

The association is supported by voluntary membership, both corporate and individual.

OFFICERS AND BOARD OF DIRECTORS, NATIONAL OCEANOGRAPHY ASSOCIATION

President: Dr. Thomas D. Barrow, senior vice president, Humble Oil & Refining Co., Houston, Tex.

Vice president: Dr. William T. Burke, School of Law, University of Washington, Seattle, Wash.

Secretary: Harmon L. Elder, vice president, Wilson E. Hamilton & Associates, Inc. Washington, D.C.

Treasurer: Kenneth H. Drummond, director, program development, Teledyne, Inc., Washington, D.C.

Vincent R. Bailey, executive vice president—Ocean Activities, Perry Oceanographics, Inc., West Palm Beach, Fla.

Dr. Wayne V. Burt, associate dean of research, Department of Oceanography, Oregon State University, Corvallis, Ore.

Dr. W. M. Chapman, director, Ralston Purina Co., San Diego, Calif.

John H. Clotworthy, president, Oceans General, Inc., Miami, Fla.

Dr. Richard A. Geyer, head, Department of Oceanography, Texas A&M University, College Station, Tex.

Dr. Theodor F. Hueter, vice president and general manager Honeywell, Inc., Marine Systems Center Seattle, Wash.

Dr. Columbus Iselin, Woods Hole Oceanographic Institution, Woods Hole, Mass.

Dr. John A. Knauss, provost for marine affairs, Narragansett Marine Laboratory, University of Rhode Island, Kingston, R.I.

Gordon Lill, former director of Mohole project, Encino, Calif.

Arthur L. Markel, vice president and general manager, Reynolds Submarine Services Corp., Miami, Fla.

John D. Moody, senior vice president, Mobil Oil Corp., New York, N.Y.

Dr. William A. Nierenberg, director, Scripps Institution of Oceanography, La Jolla, Calif.

Dr. David S. Potter, director of research, AC Electronics Defense Research Laboratories, General Motors Corp., Milwaukee, Wis.

Taylor A. Pryor, president, The Oceanic Foundation, Makapuu Point, Waimanalo, Oahu, Hawaii.

Admiral Arthur W. Radford, U.S.N. (Retired), former Chairman Joint Chiefs of Staff, Washington, D.C.

C. M. Shigley, Government affairs department the Dow Chemical Co., Midland, Mich.

Dr. F. G. Walton Smith, director, Institute of Marine and Atmospheric Sciences, University of Miami, Miami, Fla.

Richard C. Vetter, executive secretary, Committee on Oceanography, National Academy of Sciences, Washington, D.C.

Dr. James H. Wakelin, Jr., chairman of the board, The Oceanic Foundation, Makapuu Point, Waimanalo, Oahu, Hawaii.

Executive director: Richard N. Rigby, Jr.

EXHIBIT II

STATEMENT ADOPTED BY THE NATIONAL OCEANOGRAPHY ASSOCIATION BOARD OF DIRECTORS AT A MEETING SEPTEMBER 18, 1969

I. Events since January emphasize the need for a concerted national ocean program consisting of maximum private enterprise participation, appropriate Federal governmental support (reorganized and better focused through establishment of an independent ocean agency), scientific and academic participation and increased state-level involvement.

The damage inflicted by Hurricane Camille in the Gulf of Mexico in August points to our inability to predict storm paths with accuracy.

The unknown impact of waste disposal in the oceans and coastal zones shows our need for additional research.

Recent reports of coral-eating starfish attacking Hawaiian reefs demonstrates our imperfect understanding of ocean phenomena.

Growing public awareness of coastal environmental problems underscores our need to act to protect and improve our management of the coastal zone and Great Lakes for optimum multiple usage.

The disappearance of traditional fishing stock, such as haddock from New England coasts, points up our need for improved fisheries' research and management.

Accomplishments this year, in deep-sea drilling, the Northwest Passage experiment, Project Tektite, the Gulf Stream drift mission and Barbados Oceanographic and Meteorological Experiment (BOMEX) to cite several, indicate how much more we could accomplish with a more concerted industrial, academic and governmental effort.

II. The National Oceanography Association board of directors endorses the purpose of H.R. 13247 introduced by Congressman Alton A. Lennon and its Senate counterpart, S. 2841, introduced by Senator Ernest F. Hollings, establishing the National Oceanic and Atmospheric Agency (NOAA) and companion National Advisory Committee for Oceans and Atmosphere (NACOA).

We believe establishment of these bodies are essential steps in developing a strong national ocean program which has as a principal objective: "The encouragement of private investment enterprise in exploration, technological development, marine commerce, and economic utilization of the resources of the marine environment." (Sec. 102(a)(3)). We are apprehensive that the language of section 104(a), paragraphs (6) and (7), conflicts with this basic objective and traditional private enterprise responsibility and strongly recommend the words "... encourage private enterprise to make ..." before part (6) and "... encourage private enterprise in the ..." before part (7) be inserted as amendments to the bills.

III. The National Oceanography Association board of directors believes a high priority for NOAA and NACOA should be the problems of the Nation's coastal zone and shores of the Great Lakes. The goal of managing the optimum multiple uses of these national resources to accommodate recreational, industrial, transportation, fishing and other desirable uses is a major challenge for NOAA and NACOA.

It is our hope that legislation can be enacted and signed into law establishing NOAA and NACOA and charging these bodies with early study of coastal zone multiple-use problems involving extensive consultation with private and academic resources and state and local authorities.

We urge that the Nixon Administration recognize the broad public support for oceanographic advancement and back the establishment of NOAA and NACOA, thereby seizing the opportunity to support a step which as promise of immediate benefit, through better coordination of existing Federal effort, and the potential to help produce results of significance to generations ahead."

BIOGRAPHICAL INFORMATION

DR. THOMAS D. BARROW, PRESIDENT OF THE NATIONAL OCEANOGRAPHY ASSOCIATION

Dr. Thomas D. Barrow, a senior vice president and director of Humble Oil and Refining Company, was born December 27, 1924, in San Antonio, Texas, and raised in Houston.

He is a graduate of The University of Texas with a bachelor of science degree in petroleum engineering. He received an M.A. degree in geology from The University of Texas and a Ph. D. from Stanford University in the same field.

Dr. Barrow joined Humble in 1951 as a junior geologist, and has served subsequently as an area exploration geologist, regional geologist and regional exploration manager. In 1964, he joined Esso Exploration, Inc., an affiliate of Standard Oil Company (New Jersey) as a director and executive vice president. He returned to Humble the following year as a member of the board of directors and two years later was named to his present post as a senior vice president.

Among Dr. Barrow's memberships in addition to his service as National Oceanography Association president for 1969-70 are the following:

- Director, American Society for Oceanography
- Member, Oceanography Advisory Committee for the Oceanographer of the Navy
- Member, Sea Grant Advisory Panel
- Member, Marine Technology Society
- Member, U.S. Chamber of Commerce Natural Resources Committee and Marine Resources Advisory Panel

STATEMENT OF TIMOTHY J. MAY, COUNSEL, BOATING INDUSTRY ASSOCIATION

Mr. Chairman and members of the Subcommittee:

My name is Timothy J. May and I appear here today as counsel to the Boating Industry Association (BIA). Because of its great interest in the lakes and waterways of our nation, and the oceans adjacent to our shores, BIA welcomes this opportunity to participate with the Subcommittee in this most significant area of oceanographic research.

BIA is a non-profit national trade association representing more than 600 manufacturers of pleasure boats and boating equipment, and providing many services of an educational and informative nature to the entire industry and to the boating public. In addition, we work directly with boat owners in all parts of the country through our two consumer divisions, the Outboard Boating Club of America, serving members of affiliated boating clubs, and the Boat Owners Council of America, serving individual boat owners.

Each year BIA conducts a study of the market for boats and boating equipment based upon consumer questionnaires received from purchasers of new outboard motors, boats and boat trailers. These questionnaires are part of a package of materials supplied to member manufacturers by BIA, and distributed with the products at the points of sale.

In addition, BIA accumulates statistical information from the states based on the number of actual registrations of boats. From these accumulated data, BIA and the National Association of Engine and Boat Manufacturers (NAEBM) make various statistical estimates.

For example, it is estimated that more than 42 million persons participated in recreational boating last year in the United States using nearly 9 million boats. More than \$3 billion was spent at retail for new and used boats, motors, accessories, safety equipment, fuel, insurance, docking maintenance, launching, storage, repairs and club memberships.

The Department of Transportation has as its main purpose transportation safety and efficiency. For this reason the Federal Aviation Agency and the Coast Guard were brought under the DOT. In addition, matters relating to automobile safety standards, highway safety, railroad safety, pipeline safety and safety of motor carriers were all placed in the Department.

The latest figures suggest that over 70% (\$296.1 million) of the Coast Guard's budget is involved with purposes of transportation; approximately 19.0% (\$76.5 million) is expended for military matters; and 7% (\$29.4 million) is expended for oceanography.

The Coast Guard has always played a vital role in boating safety. During the fiscal year 1968, the Coast Guard responded to nearly 30 thousand calls for assistance by private vessels. The total number of persons involved in assistance cases exceeded 117 thousand.

Pursuant to the mission of the Coast Guard to promote safety it has recognized that construction safety standards by the boat building industry contribute greatly to safe boating. In this connection, close liaison is maintained with industry through several industry associations, including BIA.

The Coast Guard provides and operates many aids to navigation. The majority of these have been established for commercial purposes but all are available for use by pleasure boatmen.

In addition to the research and rescue work done by the Coast Guard, the U.S. Coast Guard Auxiliary, a volunteer, non-military organization promotes safety in recreational boating. The Auxiliary carries out two basic programs. The first is courtesy motorboat examination. This includes a thorough safety examination. In Fiscal year 1969, approximately 167 thousand of these examinations were carried out.

The Auxiliary also carries out a program of public instruction, and in 1969, more than 167 thousand recreational boats took part in classroom instruction in safe boating practices.

Because of the vital role the Coast Guard plays in marine safety, it is difficult for us to support the recommendation in H.R. 13247 that the Coast Guard be transferred to the National Oceanic and Atmospheric Agency (NOAA), whose primary function is to be the "advancement of fundamental understanding of the biological, physical, geological, and chemical characteristics of the marine environment and atmosphere."

BIA feels that this purpose is not compatible with the Coast Guard's function as the nation's principal maritime safety agency. Transfer of the Search and Rescue function to another agency would cripple a systems approach to maritime safety. The system has two essential elements, prevention of casualties and recovery when casualties occur. Because the Coast Guard's orientation is overwhelming towards transportation, and more specifically, transportation safety, its transfer to another agency would probably cause the DOT to engage in costly duplicate efforts, or perhaps even result in the dismemberment of the Coast Guard to return its transportation functions to DOT.

Dr. Robert A. Frosch, Assistant Secretary of the Navy, Research and Development, stated before the Subcommittee that the Commission Report failed to adequately consider the large proportion of the Coast Guard's work concerned with search and rescue, and with marine safety matters not closely allied to the other functions assigned to NOAA.

Because the Coast Guard is an operational agency, we also feel that its inclusion in NOAA would be further damaged by the fact that NOAA is a research organization. The Coast Guard's vast resources are not compatible with carrying out research and development programs as its main responsibility. Experience with NASA and with research and development departments in industry indicate that research-oriented programs tend to spin off operational responsibilities.

In addition the Commission Report states, "the Coast Guard represents an enormously valuable national marine resource that is at present underutilized because of traditional constraints on its mission and lack of proper milieu for its operations." This appears to be the basic premise on which the Commission Report builds its case for transferring the Coast Guard to a new agency. It is our understanding that the Coast Guard is stretched to the limit in meeting its present operational workload. If the Coast Guard is transferred, we are concerned that without substantial increases in its budget, the proposed new direction for the Coast Guard could only be achieved by elimination or reduction of the vital transportation and safety services now being performed. The financial plan of the Commission Report does not project the increase in resources needed to

continue adequate transportation and safety services and at the same time greatly expand the Marine Sciences program.

In summary, BIA strongly supports the establishment of NOAA but we cannot support the recommendation of the Commission that the Coast Guard be transferred to NOAA. We fear that such a transfer would gravely impair the vital role the Coast Guard now plays in marine safety and transportation, because of the essentially research oriented nature of NOAA.

The BIA greatly appreciates the opportunity to appear before this Subcommittee, and compliments the Commission on Marine Science, Engineering and Resources on its fine Report. One of our Board members played an active role in advising the Commission.

STATEMENT OF HOYT S. HADDOCK, EXECUTIVE DIRECTOR, AFL-CIO MARITIME COMMITTEE

My name is Hoyt S. Haddock and I am Executive Director of the AFL-CIO Maritime Committee. I am pleased to be able to present this statement to the Subcommittee on Oceanography of the House Merchant Marine and Fisheries Committee, in support of the objectives of H.R. 13247, a bill to amend the Marine Resources and Engineering Development Act of 1966 to establish a comprehensive and long-range national program of research, development, technical services, exploration and utilization with respect to our marine and atmospheric environment, which you are now considering.

The United States must provide positive leadership in the development of the oceans for peace. The United States has pursued piece-meal and at times backward approaches to the nation's ocean problems. Programs for a merchant marine, deepsea fishing, naval power and oceanographic programs have proceeded without an overall concept to inform and guide them. The result has been far short of success in any field except perhaps naval power. This obviously does not meet the nation's needs.

How fully and wisely the United States uses the oceans in the decades ahead will affect profoundly our security, our economy, our ability to meet increasing demands for food and raw materials, our position and influence in the world community and the quality of the environment in which we all live.

It is ironic that in this as in other fields we cannot proceed to meet our known needs by logical progressive programs. We seem only to be able to rise to the occasion when threatened from the outside. For example, it took "Sputnik" to put us into the space program with *purpose*.

Today, the Soviets are well on their way to building a tool (their merchant navy) to carry the foreign commerce of the world; control the political and economic life of every country; take vast amounts of protein from the oceans to feed the peoples in underdeveloped countries. Yet we continue to stumble along as though we know nothing about a merchant fleet, a fishing capability, an ability to farm and mine the oceans and exploit their vast resources for the good of man.

Must we await a "JETNIK" of the oceans to spur us on to do the jobs that we know must be done? Can we not proceed now with orderly programs to use the oceans in a great drive for peace for all mankind? Certainly we will not unless we proceed now in an orderly manner to rebuild our merchant marine to carry a substantial portion of our foreign commerce. Certainly not unless we proceed to farm the oceans and take from them literally millions of tons of additional food protein through a modern fishing fleet and sea farm system. Certainly not unless we embark now on unlocking the tremendous mineral resources which lie in and under the oceans now.

The nation has available a great and tried tool to achieve the goals which we all know must be achieved, if we are to survive as a nation. The "tool" is the nation's policy of developing dual purpose programs.

Certainly one of the greatest acts of Congress, if not the greatest, was the passage of the 1936 Merchant Marine Act. The greatness of this Act lies in its establishing a dual purpose program. A program which provided that the:

1. American merchant marine will be the tool to promote and protect our foreign commerce and serve the military in providing security for our nation; and

2. Government will provide the U.S. merchant marine (including ship-building) with economic parity with ships of foreign nations.

The 1936 Act created the conditions for an American merchant marine. Neither industry nor government would have done this job alone. We are confident that

if the executive branch had provided the administrative posture and climate called for by the Act, we would now have sufficient ships to meet the nation's needs. Even with the half-hearted and interrupted administration of the Act, it is still a considerable success.

We are confident that every member of Congress recognizes that the great strides made in the space program would not have been possible without the fullest application of this dual purpose, cooperative principle between government and industry. The difference has been that the government gave every possible encouragement to the space program, while with the merchant marine and the oceanographic program there has been budgetary privation and discouraging administrative effort.

While we plunge headlong into space, from which the needs of mankind will not come, and while our great dual purpose merchant marine program is being scuttled and along with it a meaningful oceans program, the Soviets go ahead and imaginatively apply their own multi-purpose policy to the oceans. That is a program designed by the Soviets to provide them with "Seapower," to control the oceans, their products and the commerce on them. A program which is well on its way. Unfortunately, we have not recognized this Soviet program as having equal or greater warning implications as "Sputnik". We say this because it appears that our great nation cannot move meaningfully—except in fear. What we require apparently is some great progenitor of fear, to put us on a full scale program of exploration and development of the oceans. We will not have an oceans program until we have developed our merchant marine, our ocean fishing programs. We will not explore the oceans and provide our factories with the billions of tons of mineral and protein which lie in and under the oceans until we have an on-going multi-purpose program that has the complete backing of our government in full cooperation with American industry.

With the merchant marine and fishing programs going forward properly with a multi-purpose oceans program we can unlock the secrets of the oceans and make them servants of mankind. For example, the Navy's ocean programs for security must become multi-purpose. Thus, the knowledge already available to the military can be directed to the peaceful purposes of mankind. Thus the multi-purpose policy which Congress first announced in 1936 can and must be the spring-board for the development of the oceans. The government and industry can, through such multi-purpose programs, guarantee the people with their needs and strengthen the possibility of achieving peace, which all mankind badly needs.

In my preceding remarks I have emphasized the dual purpose that the American merchant marine with which, until recent years, you gentlemen and the industry of which I am a representative are most familiar. But through the distinguished and outstanding efforts of the Congress and particularly this Committee, we are being shown the way to further strength and perfection of our proper national posture in the oceans in the broadest possible sense.

The fragmentation in the past of our ocean activities is now well on its way to being eliminated in favor of the words in the Declaration of Policy and Objectives in the Marine Resources and Development Act of 1966 in which it was stated:

"It is hereby declared to be the policy of the United States to develop, encourage, and maintain a coordinated, comprehensive, and long-range national program in marine science for the benefit of mankind to assist in protection of health and property, enhancement of commerce, transportation, and national security, rehabilitation of our commercial fisheries, and increased utilization of these and other resources."

I believe the 1966 Marine Science Act will be a permanent monument to the patience and wisdom of its authors who worked so diligently for over seven years to establish a sound statutory base for an effective long-range marine program for the United States and indeed for all mankind.

The National Council on Marine Resources and Engineering Development, under the Chairmanship of the Vice President, has coordinated on-going programs among the numerous agencies and sub-agencies of government concerned in any serious way with marine affairs. The Commission on Marine Science, Engineering and Resources, created by the 1966 Act, labored diligently for two full years with its distinguished membership and consultation and advice with all of the expertise in the nation. The landmark report, "Our Nation and the Sea," released in January of this year, is indeed a plan for national action.

The determined but careful approach adopted by this Subcommittee in its consideration of "Our Nation and the Sea" in the months immediately following its release is strongly commended.

In the light of the twelve or more days of hearings held by your Subcommittee between January and June of this year, we feel that the objectives of the bill before you, H.R. 13247, are strongly supported by the record. The creation of a central agency of the United States government with requisite authority and support to administer and coordinate the nation's several marine and atmospheric endeavors seems to us clearly an essential goal. This should eliminate the fragmentation and inefficiency of the present organizational arrangements. Full implementation of the basic recommendations of the Marine Science Commission's report will provide an organizational focus for a total marine effort, an effort emphasizing the advancement of fundamental understanding of the characteristics of the marine environment and atmosphere, the development of fundamental technology to achieve more effective use of the marine and atmospheric environments, and the other equally significant functions set forth in Section 104 of the bill.

We also strongly favor the creation of the National Advisory Committee for Oceans and Atmosphere to provide continuing review of the progress of the nation in achieving the objectives of the proposed legislation.

Despite our strong approval and support of the Commission report and the bill H.R. 13247, we would prefer to see the combined agencies proposed in the bill create the new Department of Oceans. We are told by Congressional and administrative leaders that this is not possible for the foreseeable future. If this is the case, then these agencies should be brought together in the Oceans Commission for Economic and Advanced Natural Sciences, to be known as OCEANS, or if you prefer SEAS—Seas Environmental Agency Services.

We also feel that the functions of the Maritime Administration should be incorporated in the newly organized Oceanic and Atmospheric Agency. This can simply and effectively be accomplished with a minimum of disruption of the existing bureaus proposed for incorporation into such a new agency.

Notwithstanding the reservations just expressed concerning the Department of Commerce as the focus agency and incorporation of the Maritime Administration, we do not offer at this time specific amendments to accomplish these purposes and these reservations do not diminish our support of H.R. 13247 as it will, hopefully, soon be reported by your distinguished Committee on Merchant Marine and Fisheries, followed by early and effective action in the House.

Mr. Chairman, I would like to offer for the record a document prepared and widely distributed by the National Maritime Union of America, AFL-CIO, entitled "Frontiers Below."* I think it will demonstrate to you and members of the Committee as well or better than anything I have said today that we are fully appreciative of the vital importance of early and broad effective implementation of the policies stated in the Marine Science Act of 1966.

Thus we look imaginatively to exploitation of the oceans for mankind. Yet our reasoning is alarmed at the screech and howl of the gale, a gale which warns that we will not move without a "JETNIK" blasting us out of our mental doldrums. This is the doldrum of complacency which only fear seems able to penetrate. Nevertheless, we intend to continue our hopes for mankind and the oceans. In doing this, we intend to back up a bit with our projections into the future. Today we are going to talk in terms which are totally practical. Practical terms which we can understand as necessary, and obtainable, in our time.

UNIVERSITY OF CALIFORNIA, SAN DIEGO,
La Jolla, Calif., August 26, 1969.

Hon. ALTON LENNON,
U.S. House of Representatives, Longworth House Office Building,
Washington, D.C.

DEAR MR. LENNON: Thank you for the copy of H.R. 13247. This letter is in response to your request for comments on the bill.

I support the bill and its principal objectives. As far as possible, my support and detailed comments are distilled from the combined opinions of many years of experience of the senior staff of the Scripps Institution of Oceanography.

On the whole, United States interests have historically been well served by such institutions as Scripps, Woods Hole, Lamont, the University of Washington, the Institute of Marine Sciences at Miami and the other dedicated institutions as well

*The document was placed in the files of the subcommittee.

as the involved government agencies such as ONR, the NSF and BCF. However, a great deal is lacking in terms of a really national effort and many opportunities have been missed in our failure to capitalize on important ideas that have emanated from the community.

In order to understand this we only have to examine and admire the way the AEC has planned, coordinated and executed a truly national program in their area of responsibility. My letter is too brief to allow more than a summary extraction of the successful elements of the AEC program that are lacking in our oceanographic effort. Categorically, these are :

1. General capital budget.
2. Advanced specialized engineering.
3. Special capital budgets (ships and structures).
4. Manpower needs.

Among the variety of planning functions that are required I have chosen these four because this is where the failures occur and this is just where a centralized agency is needed. Before detailing these items, I would like to explain how these failures come about. This is best understood via a counter-example and that is the operating budget. It has been my experience that a good proposal can be funded—if not one year then the next. The various agencies at present are geared to examine proposals critically and—if they pass—to vigorously prosecute the budget required to support them. This is very natural because a good administrator wishes to be associated with good programs. However, the same administrator is not likely to act as vigorously for capital equipment such as buildings, ships and structures or for such long range, non-program associated projects such as specialized engineering. He would naturally prefer others to supply this service. If as in the case of the AEC, he is part of a specialized agency, he can reasonably expect that bureaucratic efforts to obtain the long range benefits will eventually pay off for his own programs.

I, personally, have been the beneficiary of this kind of excellent planning as a section leader in the Lawrence Radiation Laboratory of the AEC. I was impressed with how facilities which must have been years in the planning became available just as we needed them.

The explanation of the items listed above is as follows :

1. The capital items referred to here form the normal capital equipment of most laboratories, i.e., mass-spectrometers, x-ray analyzers, gas chromatographs. The development of any national program depends heavily on this investment being made regularly. My previous experience indicates that an investment of about fifteen per cent of the annual operating budget is required, perhaps nearer twenty per cent, to allow for the more rapid depreciation of a rapidly developing technology. We are by no means making this kind of investment today and because of recent cutbacks, the first effects were felt in just this area by the nature of the system.

2. The major oceanographic centers should have specialized advanced engineering groups who are funded independently of specific programs but who concentrate on the special developments needed for oceanography in the period three to five years ahead. Suggested areas are seagoing computers and communications, remote power sources for benthic operations, mid-ocean platform technology, and so on. The AEC has maintained special groups for high speed electronics, accelerator design and special materials from almost its inception.

3. Ships and special offshore research structures are to oceanography what the cyclotron is to nuclear physics and a policy of supplying the ships and operating costs to the major centers on a continuing basis is required. Assuming 100% use is satisfied at such centers, greater freedom from the present patchwork support is essential.

4. A more rational manpower program is required than the present situation provides. I see overstimulation in some areas and underdevelopment in others. A single agency would be in better position to estimate these needs and assign its support on a priority basis.

I wish to emphasize that I have touched only on those deficiencies that a single agency could rectify. I do feel, however, that these are critical and are just the ones that have prevented a major national effort from getting underway. I am convinced that H.R. 13247 holds the basis for a successful solution to these problems.

Very truly yours,

WILLIAM A. NIERENBERG.

AMERICAN MACHINE & FOUNDRY Co.,
Washington, D.C., August 28, 1969.

Hon. ALTON LENNON,
House of Representatives, Committee on Merchant Marine and Fisheries, Longworth House Office Building, Washington, D.C.

DEAR MR. LENNON: Thank you for sending me a copy of H.R. 13247, along with the cover letter asking for my personal views.

In general, I personally agree with most of the contents of this Bill. However, in my opinion, there are two very important subjects deserving further comment:

1. The most important comment relates to the Advisory Committee staff as mentioned on page 17, lines 12 to 14. As stated in the Commission Report, "Our Nation and the Sea," page 246, the *Chairman of the Advisory Committee* should choose his own staff. The proposed Bill, however, leaves it up to the Agency Administrator to furnish the staff. I believe this would be a glaring error since the Advisory Committee should operate independently of the Agency in order for it to be most effective.

2. Although this has rarely been discussed in public, the key to the Executive Department reorganization hinges around *three*, not two, items. These are the proposed agency, the advisory committee, and also the establishment of a statutorily established *interagency committee* to be chaired by the Agency Administrator. It is spelled out most clearly on page VI-25 of Volume 2, "Industry and Technology" Commission Panel Report, and in earlier testimony to your subcommittee by Dr. Chalmer Kirkbridge. It is also discussed in the Commission Report on pages 244-245, although in much vaguer language. Only in this way can we help insure that the oceanographic programs of the Navy, Army, Interior and other key agencies will be coordinated with that of the proposed independent agency. Ample precedent for this is cited in the Commission Report. Also, as you know, the Assistant Secretary of the Navy for Research and Development used to have a second duty, namely that of chairman of the former Interagency Committee on Oceanography.

I believe that the language in paragraph c of page 7 in your Bill is not nearly strong enough, nor does it imply the need for a statutorily created Federal interagency mechanism.

Thank you once again for affording me the opportunity to comment on your proposed Bill.

Sincerely yours,

A. L. LANE.

Hon. ALTON LENNON,
Chairman, Subcommittee on Oceanography, House Merchant Marine and Fisheries, Longworth Building, Washington, D.C.

DEAR MR. CHAIRMAN. Thank you for your letter enclosing a copy of H.R. 13247.

I favor a NOAA to bring together the many agencies of government involved in civilian ocean activities. I also favor a NACO to bring the industry, the states and the academic community views into the execution of a sound national program that has a strong federal input.

I am concerned that there is a general lack of a sense of urgency in many areas with respect to the organization and administration of the ocean programs. I attribute this complacency to the failure of many to relate the ocean program to the "people" problems that are now pressing in this country.

I believe that the most pressing ocean problems are those of the coastal zone and that these are closely related to our "people" problems. NOAA and NACO would facilitate ocean contribute to the solutions of our "people" problems.

I think that the above point, if stressed, would increase the prospects for early enactment of H.R. 13247.

I would welcome the opportunity to discuss this view point with you at your convenience.

Sincerely,

E. C. STEPHAN,
Rear Adm., USN (Retired).

SUN OIL Co.,
Philadelphia, Pa., August 26, 1969.

Hon. ALTON LENNON,
*House of Representatives, Committee on Merchant Marine and Fisheries,
Longworth House Office Building, Washington, D.C.*

MY DEAR MR. LENNON. I appreciate your sending me a copy of H.R. 13247 along with your recent cover letter.

I found that this Bill contained the important things which I recommended in my testimony before your Subcommittee on Oceanography on May 8, 1969. Although I did not study the Bill in great detail, it impressed me as being a very good one.

The only suggestion I found which gets down to what might be classified as nit-picking is in Line 12 on Page 2. I would recommend the insertion of "industry" between the word, "of" and "commerce." Then Line 12 would read, ". . . the enchancement of industry, commerce, transportation, and national. . . ."

Thanks again for your kindness in letting me see the early version of this Bill.

Sincerely yours,

CHALMER G. KIRKBRIDE.

SUN OIL Co.,
Philadelphia, Pa., September 8, 1969.

Hon. ALTON LENNON,
*House of Representatives, Committee on Merchant Marine and Fisheries,
Longworth House Office Building, Washington, D.C.*

MY DEAR MR. LENNON. Since my letter of August 26, I have had an opportunity to review more thoroughly Bill H.R. 13247. There are two points in this connection which I would like to suggest.

1. Bill H.R. 13247 does not provide NACOA with its own staff. The Bill provides that NACOA shall get its staff from NOAA.

I think this is a mistake because under these circumstances NACOA will not be operated as an independent advisory committee.

2. Although Bill H.R. 13247 touches upon what the Stratton Report called the interagency mechanism, it is not at all clear.

In my testimony before your Subcommittee on Oceanography on May 8, 1969, I emphasized that, in my opinion, the recommendation of this interagency mechanism was the third most important thing recommended by the Stratton Report. I therefore think that the Bill could be strengthened if more emphasis were given to clarifying this situation.

Otherwise, I think this is a very fine Bill and I hope that you can put it through at an early date.

Sincerely yours,

CHALMER G. KIRKBRIDE.

COMMENTS—H.R. 13247

I have reviewed the Bill in detail and feel that it proposes to solve the most immediate problems which beset our national posture.

The most pressing problem at present is the multiagency responsibility in the ocean and coastal zone. This creates multiple priorities, costly overlaps, duplication, and, most important, a fragmented and confusing representation of funding needs and priorities to Congress.

The second most urgent problem is the *coordinated definition* of the nature and scope of the elements, which contribute to *effective use* of ocean, coastal, and lake regions.

With the element definitions completed, identification can be made of the *real* problems, which contribute to the mismanagement of our marine resources. This would allow a set of priorities to be established, solutions proposed, costed, and finally defended to the Congress in order to fund and solve those problems.

The inclusion of the Atmospheric responsibilities is very logical, since the origin of the most significant weather phenomenon, its causes and control, is directly related to the ocean and the atmosphere above the ocean (over three-fourths of the global surface). The coordination and the resources should reside in a single agency to permit the Weather Bureau to most effectively achieve its responsibilities of measurement, prediction, and ultimately control of the forces of weather.

The policies and objectives of the Proposed Agency, coupled with the Functions and Powers assigned, is a major step which would provide the Executive Branch with the tools with which to solve our most immediate ocean resource management problems.

I am aware of, and support, the Administration's objectives in setting up the Ash Committee to review and recommend a more modern and effective organization of the Executive Branch. However, as one who has been intimately involved in the exploration and exploitation of the oceans' living and nonliving resources, and who, through cooperation as well as competition, has been exposed to the Federal and industrial resources of foreign countries which have recognized the ocean's potentials, I believe the time to act is now.

An emphasis at the Federal level including a National Posture of words and a National Program of action is imperative.

A two-year delay in starting the program will cost several billions of dollars more than starting now to restore many of our marine resources. It will also cause our balance of payments to suffer, for perhaps years, if we do not compete with the rest of the world in Research and Development in the ocean. Other countries will be in the "Production Stage" in the ocean while the United States is catching up on Research and Development.

Surely U.S. fisheries and maritime industries alone provide an adequate example of what we can expect in the future. In fish products our balance of payments is a negative number of several hundred million dollars, and tariffs are not the answer.

I strongly support this Bill and am urging my colleagues in industry to do so also.

LIONEL S. JOHNS,

Director of Corporate Marketing, Ocean Science and Engineering.

HOUSE OF REPRESENTATIVES,
Washington, D.C., October 28, 1969.

Hon. ALTON LENNON,
Chairman, Subcommittee on Oceanography, Merchant Marine and Fisheries Committee, Rayburn House Office Building, Washington, D.C.

DEAR ALTON: Enclosed find a review of H.R. 13247 written by a member of my committee on Oceanography who is head of the Department of Oceanography at Florida Institute of Technology in Melbourne, Florida.

I think his comments are cogent and would hope with your approval they could be placed in the record.

Most sincerely,

LOU FREY, Jr.

Enclosure.

Department of Oceanography
Florida Institute of Technology
Melbourne, Fla.

MEMO

To: Ron Ring.
From: George Webster.
Date: October 20, 1969.
Subject: Comments on H.R. 13247, a Bill to Establish a National Oceanic and Atmospheric Agency.

The passage of this bill would appear to do much for the promotion of the development of the oceans for the benefit of our citizens. The following benefits come to mind immediately:

1. There is an overall advantage to having most oceanographic research and development in a single agency. Although the proliferation of Government agencies is not to be encouraged, the advantages in this particular instance would seem to be similar to the advantages attained when various space activities of the Navy, Army, Air Force, and other Government agencies were transferred to NACA to form the National Aeronautics and Space Administration. The focus of effort relating to space in this instance was both dramatic and extremely productive, and it would not be surprising if a similar focus in NOAA would be equally productive, although probably not quite so dramatic.

2. A single agency for oceanographic activity would concentrate the large amount of oceanographic information produced by the Federal Government into one place where a public or private organization could turn for information. A real problem for a researcher, such as myself, is to keep informed of oceanographic information currently being uncovered in my field, so that I can both make decisions on work to be done, and translate current basic research results into information useful to our community. Presently, I must try to keep in touch with the oceanographic activities of the Navy, ESSA, the Bureau of Fisheries, the Bureau of Sport Fishing, Public Health Service, Commission on Marine Sciences, and the National Science Foundation. Even then, I sometimes find information has been produced by a Federal agency that I was not aware was doing anything related to oceanography.

3. A single agency could provide a badly needed point for consultation and advice for businesses wishing to evaluate the potential of some particular aspect of oceanic activity. This could result in a considerable increase in both interest and productive business activity relating to the oceans. Also, the probable awarding of the small developmental contracts to industries would be a stimulus for further investment in oceanic development.

4. Probably most important to our present state of knowledge regarding the ocean, would be the encouragement a single oceanic agency would give to research on the oceans. If the oceans are to provide maximum benefits for our country, it is essential that we know what benefits can be obtained from the physical, chemical, and biological components of the ocean, and that this knowledge be translated into solid benefits for our people. It is asking a great deal for our industries to invest the large amount of money required for the basic research to uncover the many useful things in the ocean. Support for research, however, is split among so many agencies with differing policies on what they will support, that considerable effort is wasted in finding the agency interested in a particular problem. This contrasts with medical research, for example, where the Public Health Service has a clear mandate to provide research support. An agency such as is proposed here could pursue this basic research and translate it into the beginnings of development, both in its own laboratories, and through grants to university oceanographic institutes. Florida, which currently has a number of such university institutes and oceanography departments under development, could benefit greatly from this activity. The support of vigorous research programs in our Central Florida universities could provide considerable help for Central Florida industries which are interested in oceanic development.

The provisions of the bill appear to be quite sound. The principal provision that has me puzzled is the transfer of the Coast Guard to this agency, since the Coast Guard is more of a regulatory and rescue agency while the other agencies that are proposed to be transferred to NOAA are research, development, and service agencies. This point does not detract from the overall potential advantages offered by the bill.

NATIONAL WILDLIFE FEDERATION,
Washington, D.C., November 14, 1969.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: We have been asked to transmit to you our observations about H.R. 13247, "To amend the Marine Resources and Engineering Development Act of 1966." We understand that this bill is up for executive consideration before your Subcommittee next week.

Our organization is in agreement with the general policy and objectives of the "National Oceanic and Atmospheric Program Act of 1969." We believe that a comprehensive, coordinated and continuing national program in marine and atmospheric science, technology and technical services is necessary and advisable if the U.S. is to keep pace with many of the other Nations. However, we would hope the accelerated development and utilization of the resources of the marine environment cited in Section 102(a)(1) can be done in accordance with established conservation principles which feature the concept of wise use. We agree that a "National Advisory Committee for Oceans and Atmosphere" would serve a beneficial purpose of giving worthwhile advice to the Administrator of the program.

We are not in agreement with the proposal to transfer both the Bureau of Commercial Fisheries and the marine and anadromous fisheries programs of the Bureau of Sport Fisheries and Wildlife to a new National Oceanic and Atmospheric Agency. We recognize that many portions of the program of the Bureau of Commercial Fisheries are focused principally towards promotion of commercial aspects of marine resources and quite possibly could be transferred to some other agency, although this might as well be the Department of Commerce as the new Oceanic agency. However, it is so difficult to separate the *management* of oceanic fisheries resources and fresh water resources, including anadromous species which migrate between the two that we believe it would be beneficial to keep these together in the Department of the Interior. These resources are involved intimately with other programs of the Interior Department, such as Water Resources Research, Federal Water Pollution Control Administration, Geological Survey, etc.

Thank you for the opportunity of making these observations.

Sincerely,

LOUIS S. CLAPPER,
Conservation Director.

STATE OF NORTH CAROLINA,
DEPARTMENT OF WATER AND AIR RESOURCES,
October 24, 1969.

In general, the report emphasizes the need for a drastic increase in the scope of numerous activities now being performed in some measure by various Federal and State agencies. We believe that the failure to provide necessary funds, either Federally or locally, will not be cured by the creation of new agencies and that the lack of progress on a series of programs is not in any way an automatic indictment of existing agencies. It is recognized that an agency to coordinate the pure marine science research work with existing Federal and State agencies who would continue to carry out the applied research and operational phase of oceanographic and other marine work is necessary. Such an agency should function very similar to the Water Resources Research Institute created by Public Law 88-379. This agency has performed in a very commendable manner in North Carolina and has filled a much needed role.

The formation of such a Coastal Zone Research Coordinating Agency seems to be highly desirable as a focal point for State marine sciences research activities. The Department of Conservation and Development appears to be the logical parent organization for such an agency inasmuch as it is responsible for many subjects that will be included in marine science research investigation. The problem to be considered is the determination of the functions and authority of such an agency.

The scope of the "Plan for National Action" is so great that even a generously financed State agency would have difficulty making its mark in the areas not now assigned to one or more other State agencies. Hence, it appears that the agency might be most effective in a combination coordination and research role; the first aimed to index, catalog and coordinate marine science research work being preformed by others (Federal, State, and private interest); second, to generate effective joint scientific research efforts for such departments as Water and Air Resources, Local Affairs, and Wildlife Resources Commission, and to apply direct effort to problems not encompassed by other agencies.

I further recommend that the management of such a Marine Science Program be essentially as outlined in the National Estuarine Pollution Study which was directed by the Clean Water Restoration Act P.L. 89-753.

GEORGE E. PICKETT, *Director.*

RCA DEFENSE ELECTRONIC PRODUCTS,
MOORESTOWN, N.J., *October 10, 1969.*

HON. ALTON LENNON,
Member of Congress, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, Room 1334, Longworth House Office Bldg., Washington, D.C.

DEAR MR. LENNON: Thank you for providing RCA Defense Electronic Products an opportunity to comment on H.R. 13247 while it is still pending before the House Subcommittee on Oceanography.

We believe the policies and objectives set forth, and the new agency proposed, will give desirable impetus to a long needed national program. Our only reservation to the bill at this time is that the proposed shift of the Coast Guard from the Department of Transportation to the new agency may not prove to be necessary to the accomplishment of the objectives in Oceanic and Atmospheric programs, and could, if consummated, work to the disadvantage of the Department of Transportation in its efforts to rebuild our sea transport capability and maximize its integration with other transportation systems.

We wish you success with the proposed Bill and thank you again for offering RCA Defense Electronic Products an opportunity to comment.

Sincerely,

J. G. MULLEN,
Manager, Advertising & Customer Relations.

THE IZAAK WALTON LEAGUE OF AMERICA,
GLENVIEW, ILL., November 17, 1969.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, U.S. House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: We have been asked to express our views on H.R. 13247 "To amend the Marine Resources and Engineering Development Act of 1966", which we understand will be before your Committee shortly.

The League can support the general policy and objectives of the proposed Act, but would oppose the transfer of the Bureau of Commercial Fisheries and the marine and anadromous fish programs of the BSWF to a new agency. While some commercial aspects of the Bureau of Commercial Fisheries program might be transferred out of Interior, we believe the marine and fresh water resources management programs should be kept together with other basic resource agencies of Interior to which they are so closely tied.

Your long time concern and effective leadership in all these matters are greatly appreciated by the Izaak Walton League.

Sincerely,

J. W. PENFOLD,
Conservation Director.

SEPTEMBER 15, 1969.

HON. ALTON LENNON,
*House of Representatives,
Washington, D.C.*

DEAR MR. LENNON: I am writing to you to comment on Bill HR13247 which I recently reviewed.

As a segment of industry, interested in the exploration and productive new uses of the ocean, I believe Bill HR13247 contains the essential features and required functions to equip a National Oceanic and Atmospheric Agency to provide world leadership in our ocean endeavors.

I am, personally, very keenly aware of the amount of liaison, coordination, and management expertise which will be necessary in building a strong program. Oceanographic activities have progressed to-date but in a rather helter-skelter uncoordinated wasteful way.

Sincerely yours,

ARTHUR L. MARKEL,
Vice President and General Manager.

WASHINGTON, D.C. August 27, 1969.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, House Committee on Merchant Marine and Fisheries, Washington, D.C.

DEAR MR. CHAIRMAN: I am pleased to respond to your gracious invitation to comment on current U.S. Policy relating to oceanography and the marine sciences.

I first took an interest in the importance of the ocean some ten years ago when the National Academy of Sciences called attention to our neglect in studying the sea and its potential to serve human needs. The Congress sought to correct

our feeble scientific efforts. Members of the House of Representatives and the Senate—with vision and dedication—set out to remedy our neglect.

Good progress was made in fashioning the tools to study the sea—ships and laboratories and trained manpower began to match our needs. But the legislators who grasped the promise of the sea also saw that the gap in fulfillment had not been narrowed.

In 1966, the Congress passed the Marine Resources and Engineering Development Act, and as Vice President of the United States I was assigned a statutory responsibility to preside over a Cabinet-level Council to carry out the mandate for more effective utilization of the sea. In advising and assisting President Johnson on marine affairs, the Council took note of marine science missions and capabilities spread among eleven Federal agencies, and endeavored to focus and strengthen their collective efforts. We then took deliberate steps to assess the social and economic concerns that beset our people and determine how the oceans—through modern science and technology—could contribute more fully to our welfare.

We found many opportunities:

The potential harvest of marine protein could help meet worldwide malnutrition, especially the permanent debilitation that is the fate of protein deficient children;

The need to manage our bays and estuaries so that the increasing solid and liquid wastes of a growing population are not unwittingly pushed further downstream, there to pollute the nursery grounds of valuable shellfish, endanger human health, and deter water-related recreation sought by an urban-fatigued citizenry;

The uncharted expanses of seabed oil, gas and minerals that will be required to supplement continental sources for an energy and ore hungry world;

The role of the coastal zone for an essential maritime trade, that in turn needs rehabilitation of our ports, harbors and merchant fleet;

The function of the sea as the source of rainfall and the generator of weather—even to the heartland of the continent—which, with increased knowledge, could afford improved storm prediction and, one day, weather modification;

The historic role of the seas as a highway for culture as well as commerce, now emerging as a potent locale for international cooperation among all nations who share in ignorance of the sea today but could share in its benefits tomorrow.

The Council acted to meet this challenge, and I believe its record speaks for itself. It sorted out key goals, and began preparing a blueprint for action that involved a partnership among the Federal agencies, but also calling on the innovation of American industry, the knowledge-generating capacities of the universities, the interests of our State governments, and the participation of other governments.

With so great a task, and with so complex and fragmented a base of activities, the Johnson-Humphrey administration could do no more than begin. Its legacy of focusing new attention on the ocean is now on the agenda of the Nixon-Agnew administration.

President Nixon wrote me just before taking office, stating his interest in further advances in marine sciences, and asking my assistance in gaining support for this area. Thus your invitation provides an occasion to speak out.

First, I want to remind our leaders of both parties and our citizens that we have not yet fully realized the full importance to mankind of the 71 percent of our planet covered by oceans. And our level of efforts for exploration and resource development are still seriously inadequate.

We cannot delay in extracting protein for starving children.

We cannot delay in diplomatic initiatives to recall that seabed resources beyond national sovereignty are a common heritage of all mankind, and that we must head off a squatter's right approach.

We cannot delay in committing support to the International Decade of Ocean Exploration which the United States proposed 18 months ago.

We cannot delay in helping less developed nations that front on the sea realize fruits of marine development so that benefits will not accrue only to the technologically advanced.

We cannot delay in rational management of the coastal margin so that the seashore will serve our children and future generations.

We cannot delay in maintaining our leadership as a maritime nation by strengthening our merchant fleet and fishing industry.

We cannot delay in developing technological capabilities so that the high risks of marine engineering can be shared by government and industry.

We cannot delay taking all possible steps to make sure the arms race is not extended to the seabed. This is an area I began to work on weeks after the Council came into being in 1966 and I am pleased to see the spadework of that era now developed by the administration in a draft treaty set before the Eighteen Nation Disarmament Conference. In my view, however, the scope of the prohibition of nuclear warfare in the oceans should be broader than that proposed in Article One of the U.S. draft. We should propose to cover in this treaty activities and weapons, such as mobile nuclear bottom launchers, which may be undertaken by military planners to the fullest extent that existing and projected detection capabilities will permit.

Fortunately, these and other marine science issues have never been partisan issues, and this same spirit must continue to prevail. The two branches of the Congress, however, must elevate this area to a more conspicuous level of attention. For one thing, we now have the recommendations of the Stratton Commission that was authorized by the 1966 Marine Sciences Act, and I commend this powerful and persuasive document, prepared by 15 distinguished citizens, to all who have interest in our nation's future. I find myself in substantial agreement with their findings and recommendations.

I want to comment particularly on the Commission's recommendation for strengthening our governmental apparatus to meet the needs of the 1970's and the 1980's. They propose that a new independent civilian agency be created out of the fragments now spread among numerous departments having broad missions to which their marine science bureaus contribute only peripherally. I fully support this concept.

I was pleased to see that the management capabilities of the Council warranted support for a one year extension by President Nixon, but no matter how effective it has been and continues to be as a policy planning unit to provide coherent guidance to this government's program, it is no substitute for a strong operating agency. The Navy has shown us how to mobilize marine research and engineering to serve military objectives. We need the same approach on the civilian side for all the purposes I outlined earlier. The present efforts of the civilian agencies simply do not add up to a capability that would permit the U.S. to maintain its leadership in marine science and oceanography.

We have just witnessed the dramatic extension of man's presence to the surface of the moon—an event which satisfied the innate curiosity of all people about the world around us.

We can do no less for the sea. And in gaining a greater comprehension of its potential, we can direct its utilization to practical benefit that would serve our nation well, and serve all mankind.

Sincerely,

HUBERT H. HUMPHREY.

OCEANS GENERAL, INC.,
MIAMI, FLA. 33130, September 26, 1969.

HON. ALTON LENNON,

Chairman, House of Representatives, Subcommittee on Oceanography of the Committee on Merchant Marine and Fisheries, Longworth Building, Washington, D.C.

DEAR CONGRESSMAN LENNON: I appreciated received from you a copy of H.R. 13247 and the invitation to submit comments to the Subcommittee.

On May 22nd, 1969 I testified before the Subcommittee on Oceanography as a spokesman for the National Oceanography Association. At that time I was speaking to the Report of the Stratton Commission and I single out for particular note the recommendations with regard to Federal organization pertaining to the establishment of a responsive National Ocean Program. I gave unqualified support to the creation of a National Oceanographic and Atmospheric Agency and a companion National Advisory Committee for the Oceans. It is quite natural then that I personally endorse most whole-heartedly HR 13247, a legislative embodiment of the recommendations of Dr. Stratton and his able Commissioners.

With specific legislation to consider, I do feel obliged to comment on two sections in which the language, but more particularly the possible interpretation of the language, leaves some question in my mind. However, I want to emphasize the fact that I have no reservations with regard to the philosophy espoused, the fundamental mechanism proposed for administering a National Ocean Program or the constituent parts of NOAA.

In earlier testimony before the Subcommittee on Oceanography in August of 1965, I made reference to the role of the Federal Government in establishing policy and fostering the acquisition of scientific competence in ocean science. At that time I said, "Now, to gain this scientific competence is not something that industry or the academic community can achieve for itself. The job is too big for private investment or endowment. More significantly, it is too closely linked to the formation of public policy to be entrusted to private direction. In brief, the problems faced by the ocean sciences are outside the ability or sphere of any private group. It is traditionally and most appropriately a major effort which requires action and coordination on the Federal level". Later in answer to a question from Mr. Reinecke, I continued, "In my prepared statement I have tried to draw a clear distinction between the science and the technology. The technology is the applier of science. I feel that the private sector of our economy is amply motivated to exploit the ocean, to apply the science, to develop the technology, and that the natural forces at work in the economy are quite satisfactory and will provide impetus where impetus is needed."

I feel every bit as strongly committed to that position today as I did then and continue to see the role of the Federal Government as one of creating the climate for private investment in the exploitative phase of oceanic resource development. Hence I do become concerned when in H.R. 13247, page 6, lines 16 and 17, I find the words "development, construction, testing and operation of vehicles and associated equipment". To a zealous and energetic administrator in the proposed NOAA this is an open invitation to use Federal funds to accomplish tasks which are, in my view, best done within the private sector. These are not climate creating actions in a positive sense. In fact a contrary view can be defended, for if the Federal Government will undertake such research and development tasks with public money why then should the private sector make an investment? I have no objections to the Agency's exploration of the marine environment but it seems to me that the latitude granted in the entirety of paragraph (7) on page 6 goes too far.

Also on page 6 under paragraph (6) I am concerned that the latitude granted here might encourage an administrator to evaluate marine resources for the purposes of establishing minimum acceptable prices on bidding. The question is one of precision in the conduct of the surveys. If NOAA gets into the business of evaluating marine resources it is in effect second guessing a well established system which relies on the proven forces in the market place. The competitive system of bidding presently used relies on the judgment of one bidder versus another as to the worth and risk associated with a particular resource deposit and of its potential value to the company after the costs of extraction have been absorbed. For a Federal Agency to tinker in this part of the resource acquisition cycle, where economic value is so very speculative, would be dangerous.

We have a recent incident of this in the rejection by the Department of the Interior of bids on certain offshore sulphur leases. All bids were rejected because the Department did not feel that the highest price offered was adequate. The bidders know best the cost of developing the resource deposit and I can see no justification, given free and open bidding, for an administrator in the Department of Interior to reject the high bid as being inadequate. If this situation is left alone or further encouraged under the provision of HR 13247, I suggest that the next step is for the Federal Government to go into the exploitive phase of resource development in the absence of what an administrator considers an adequate bid from the private sector. The tired logic of the Federal Government having to do something that the private sector refuses to do will be advanced and another step may be taken in the expansion of Federal activities into fields well handled by the private sector in the past.

In both paragraphs (6) and (7) I would much prefer words to the effect that the administrator take such action as may be necessary to encourage the private sector to accomplish the tasks.

As a citizen vitally concerned with the future of the United States vis-a-vis the world ocean and the seemingly endless ways in which it effects our economy, security and general well-being I want to acknowledge with sincere appreciation the leadership you have given the cause of establishing a National Ocean Program. I want to assure you as well of my continued support and the promise that I will do everything possible through personal and business associations to broaden and intensify the base of national support for HR 13247 and other legislation which will implement the Stratton Commission Report.

Cordially yours,

J. H. CLOTWORTHY, *President.*

OCEAN SCIENCE CAPITAL CORP.,
Palo Alto, Calif., September 8, 1969.

HON. ALTON LENNON,
House of Representatives, Committee on Merchant Marine and Fisheries, Longworth House Office Building, Washington, D.C.

DEAR MR. LENNON: Thank you for the copy of your bill H.R. 13247, the National Oceanic and Atmospheric Program Act of 1969.

Speaking from my professional business viewpoint in the ocean science industry, I endorse your bill to set up within the Federal Government a NOAA-type organization along the general lines proposed by the Stratton Commission. I have enclosed a copy of a brief brochure describing our company's operations and you can see our close association with approximately a dozen companies involved in ocean science enterprise. It is my belief shared by most of my business colleagues that coordinated action and purpose is required within the Federal Government structure before a meaningful oceanographic program is possible within the United States. The NOAA-type organization such as is proposed by your H.R. 13247 is the product of careful study and deliberation by very knowledgeable men in this field in whom I have faith and thus must represent the most rational and proper course of action for our Federal Government to take.

As you are quite aware, there has been over the past five years major efforts put forth by the private sector to develop in the United States a strong oceanographic industrial capability. Of late, however, the pressures on government funding caused by external needs plus other pressing internal economic requirements has left the budding oceanographic industrial capability in United States with little economic encouragement from our Government. This lack of Federal funding compounded by a vastly disorganized Federal "purpose" in oceanographic endeavor has caused much of the private sector oceanographic enterprise begun of late to pull back. Recognizing that major economic inputs by the Government into a national oceanographic program is an unlikely event in the near future, I think it highly proper for the Federal Government to do some proper house-keeping on the organizational status of its oceanographic program so that the country can rise to meet its ocean related needs when either the economic means are available or when such activity is forced upon the U.S. by outside factors not yet obvious (i.e.: an oceanographic sputnik).

Thank you for the opportunity of commenting on your bill.

Sincerely,

F. WARD PAINE, *President.*

NATIONAL AUDUBON SOCIETY,
Publisher of Audubon Magazine,
New York, N.Y., November 14, 1969.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, House Committee on Merchant Marine and Fisheries, House Office Building, Washington, D.C.

DEAR MR. LENNON: I understand your Subcommittee may be acting soon in executive session to mark up and possibly to report H.R. 13247, your important bill that would, among other purposes, establish an independent federal agency to be called the National Oceanic and Atmospheric Agency.

The National Audubon Society respectfully but strongly urges the Subcommittee, before reporting this bill, to delete subsections (c) and (d) on page 19.

The ecological relationships between the resources regulated and administered by the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries are so close that it is essential the policies and programs of these two bureaus be closely coordinated. This is the reason why both are now lodged in the U.S. Fish and Wildlife Service, within the Department of the Interior, where common principles of conservation and management can be applied. It is an arrangement that also enhances coordination and economies in research.

I believe that upon reflection the Subcommittee will see the advisability of keeping the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife together within the Department of the Interior.

Sincerely yours,

CHARLES H. CALLISON,
Executive Vice President.

EG&G INTERNATIONAL, INC.,
Waltham, Mass., September 4, 1969.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

GENTLEMEN: We welcome this opportunity to endorse H.R. 13247.

EG&G is one of the early participants in oceanography, starting with the work of Dr. Edgerton in 1950. We are now a leading supplier of oceanographic instrumentation; we provide scientific services in the ASW and meteorological fields, and provide marine geophysical services to the petroleum industry. We remain totally convinced of the importance and potential of marine and atmospheric sciences as stated in the declaration of H.R. 13247.

We testified for and supported the legislation enabling the Commission on Marine Sciences. The report of that Commission was outstanding in its objectivity, insight and foresight. H.R. 13247 is an appropriate response.

It is recognized that enactment of this legislation is not an easy step, but major steps forward seldom are easy. EG&G will welcome any opportunity to be of assistance.

Yours very truly,

M. ROSS YEITER,
Vice President and General Manager.

HYDRO-SPACE SYSTEMS CORP.,
September 2, 1969.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, House of Representatives, Longworth House Office Building, Washington, D.C.

DEAR MR. LENNON: I have received a copy of H.R. 13247 and have reviewed it in detail.

I heartily endorse all provisions of this bill with no comment or suggested changes. As you know from the testimony I presented to your Committee, I feel the points covered in this bill represent the very best start we could make in a national ocean program. It is my hope that legislation will be passed to allow a start in this very challenging effort of ocean exploitation in the very near future.

Sincerely yours,

ROGER J. PIERCE.

WOODS HOLE OCEANOGRAPHIC INSTITUTION,
Woods Hole, Mass., August 28, 1969.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

MY DEAR CONGRESSMAN LENNON: I appreciate very much your sending me a copy of the proposed National Oceanic and Atmospheric Program Act of 1969 (H.R. 13247). I am greatly encouraged to know that you and your colleagues have taken this important step. It is another of the many progressive steps that have been typical of your Subcommittee.

As I testified before the Subcommittee on Oceanography last May, I believe the establishment of an independent agency is the most important single recommendation of the Marine Commission Report. Realizing that there are many different ways such an agency could be put together, I do believe that the plan outlined in H.R. 13247 is a good way and will work.

My greatest concern in the establishment of such an agency is the combination in the same agency of operating and funding functions. With the outstanding exception of the Office of Naval Research in the Navy, I know of no government agency which has successfully performed both these functions. When the in-house projects compete directly with a contracts program, the strength of the contracts program is constantly in jeopardy.

Therefore, I would recommend that any Act establishing an independent agency for support of ocean activity require that the contracts research program be administered separately from the in-house research program. Through ONR and NSF support we have built an outstanding oceanography program in private

and university-sponsored laboratories. It is important to insure the continued strength of these laboratories so that they may continue to provide the leadership in marine science in the United States.

If the act could include legislative guidelines providing for the continued independence of the contracts research program, I would enthusiastically support its passage.

Sincerely yours,

PAUL M. FYE.

CALIFORNIA ADVISORY COMMISSION ON MARINE AND COASTAL RESOURCES.

Sacramento, September 16, 1969.

HON. ALTON LENNON,

Chairman, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR CONGRESSMAN LENNON: At its Fifth meeting held in Sacramento, California, June 6 and 7, 1969, the California Advisory Commission on Marine and Coastal Resources undertook a review of the report "Our Nation and the Sea" of the President's Commission on Marine Science, Engineering and Resources. I attach hereto a copy of this report, which is extracted from pages 62 through 70 of the Proceedings of the Fifth meeting of the California Advisory Commission on Marine and Coastal Resources. I would appreciate it if this were included in the record of your Hearings on H.R. 13247, as being pertinent thereto.

The California Advisory Commission on Marine and Coastal Resources is appointed by the Governor of California pursuant to Legislation adopted in 1967. The list of current Commissioners is attached hereto, being excerpted from pages 19 through 21 of the published reports of the Commission's Fifth meeting. The Commissioners who attended the Fifth meeting and participated in these decisions are noted with an asterisk on this list. All other Commissioner's had an opportunity to review these decisions before the proceedings of the Fifth meeting went to press.

Several of these Commissioner's (myself included pursuant to your invitation) will submit testimony on H.R. 13247 in their individual capacities, as will Lieutenant Reinecke, Chairman of the Interagency Council on Ocean Resources, on behalf of the Executive Branch of the California State Government. I thought, however, that it might be useful to you in your deliberations to have the comments adopted jointly by this Commission which is rather widely representative of industry and academic sectors of the California society.

Sincerely yours,

W. M. CHAPMAN, *Chairman.*

PROCEEDINGS OF THE FIFTH MEETING CALIFORNIA ADVISORY COMMISSION ON MARINE AND COASTAL RESOURCES

Appendix XI Commission Review of the Report "Our Nation and the Sea" by the President Commission on Marine Science, Engineering and Resources

I. Transportation and Trade.—A. Recommendations Approved

All conclusions and recommendations respecting transportation and trade given in *Our Nation and the Sea* and in Volumes 1 and 2 of the Commission's panel reports.

CMC Comment.—California will be affected markedly if these conclusions and recommendations are implemented.

II. Living Resources.—A. Recommendations Approved

1. Statement by the Commission that "U.S. interest in marine resource development must be viewed in terms of world needs and capabilities. The sea is a global source of goods and services for all mankind." (Rpt. P. 83.)

CMC Comment.—This statement plus the general policy of rejecting the idea that the United States should be self-sufficient in natural resources concludes that the United States is obviously benefited by maintaining the availability of all sources of raw material. From the point of view of the overall fish business this is an extremely important conclusion and clearly should be adopted as national policy in order to maintain the environment of free trade that has always existed and which is essential to provide the United States with her total fish requirements.

2. Recommendation that "the National Oceanic and Atmospheric Agency (BCF) be given statutory authority to assume regulatory jurisdiction of endangered fisheries when it can be demonstrated that:

A particular stock of marine or andromous fish migrate between the waters of one State and those of another, or between territorial waters and the contiguous zone or high seas, and

The catch enters into interstate or international commerce, and

Sound biological evidence demonstrates that the stock has been significantly reduced or endangered by acts of man, and

The State or States within whose waters these conditions exist have not taken effective remedial action." (Rpt. p. 97.)

CMC Comment.—Very few fish understand state, international, political or regulatory boundaries, whatever arrangements are made among political entities and management of species crossing such boundaries must be based on the populations themselves. CMC views this particular recommendation with keen interest and expects it to be a sharp spur to the State of California to undertake proper and competent management of those marine resources under its jurisdiction.

B. Recommendations Disapproved

1. Recommendation that "fisheries management have as a major objective production of the largest net economic return consistent with the biological capabilities of the exploited stocks." (Rpt. p. 92.)

2. Recommendation that "voluntary steps be taken—and, if necessary, Government action—to reduce excess fishing effort in order to make it possible for fishermen to improve their net economic return and thereby to rehabilitate the harvesting segment of the U.S. fishing industry." (Rpt. p. 93.)

CMC Comment.—In the management of a flow resource, such as fishery, the absolute minimum objective of management should be the protection of the resource against being so depleted that it is incapable of recovery when exploitation rate is decreased. In the case of most fisheries the socially and economically desirable level of fish population and average catch is above this level.

Since most fisheries resources are not private property that would allow this level to be attained by the operation of the market system, it needs to be operationally determined by constraints imposed by government. In most cases the appropriate constraint is the maximum sustainable physical yield.

It is desirable in general to increase net economic return within the constraint of maximum sustainable yield. In some cases, however, full employment or other social objectives may dictate some decreases in net economic return to attain such objectives. Increasing the net economic return involves creation of property rights in one form or another. It is important that this be done in a manner to increase, not decrease, the efficiency and capability of the fishing industry.

3. Recommendation that "the United States seek agreement in ICNAF to collaborate with NEAFC in fixing a single annual overall catch limit for the cod and haddock fisheries of the North Atlantic, including the whole ICNAF area and Region 1 of the NEAFC area (East Greenland, Iceland, and the Northeast Arctic). This single annual overall catch limit should be designed to maintain the maximum sustainable yield of the fishery and, in turn, should be divided into annual national catch quotas. The overall catch limit should be adjusted regularly to take account of such factors as year-class fluctuations of the stocks, recovery of the stocks due to conservation measures, and errors in setting prior limits.

"Every participating nation should be authorized to transfer all or part of its quota to any other nation." (Rpt. pp. 105, 106.)

CMC Comment.—One thing that is demonstrated both by theory and by experience, especially with the Antarctic whales, is that separate species and separate population units have to be considered separately if there is to be rational management of the fishery to maintain the various populations in that condition where they will be capable of providing the maximum sustainable yield. Otherwise, if all are treated as a single pot of fish, the most valuable, or most readily available species or stocks will be badly overfished, while others remain underfished.

4. Statement that "the allocation of national catch quotas is not a problem of either biology economics, law or logic . . ." (3 Panel Rpts., *Marine Resources and Legal-Political Arrangements for Their Development*, p. VIII-59.)

CMC Comment.—It is doubtless true that other factors will need to be taken into account, but a rational solution cannot be determined by ignoring both biology and economics. For example, if the quota system is to maximize the economic yield, let alone take care of equity among nations, it will certainly be necessary to take into account the nature of the stock structure and migrations, the availability of fish from various stocks in relation to the running time from various ports. Much of this requires knowledge of the biological factors.

5. Recommendation that "serious consideration be given to assuring coastal nations a reasonable opportunity to participate in the exploitation of fish stocks nearest their coasts. This assurance should take the form of an agreement to allocate national catch quotas whenever the coastal nation requests such quotas. The quotas should be allotted to guarantee the coastal nation a minimum amount or percentage of the catch." (Rpt. p. 110.)

CMC Comment.—This, apparently, has not been very carefully considered. What happens when there are a great many coastal states, such as, for example, along the west coast of Africa, or along the coast of Central America, and the coastal states are not all simultaneously ready and willing? The recommendation that each state having a quota is required to catch it with vessels carrying its own flag is inconsistent with the recommendation made in the case of the North Atlantic fisheries quotas for haddock and cod, which advocated that "every participating nation should be authorized to transfer all or part of its quota to any other nation."

III. *Coastal and Tidelands.*—A. *Recommendations Approved.*

1. All set forth in Chapter 3 on "Management of the Coastal Zone," except as noted below:

CMC Comment. The Coastal Zone Authorities should be entirely a creature of the respective coastal States. It is noted that the Report defines the coastal zone "as including (1) seaward, the territorial sea of the United States and (2) landward, the tidal waters on the landward side of the low water mark along the coast, the Great Lakes, port and harbor facilities, marine recreational areas, and industrial and commercial sites dependent upon the seas or the Great Lakes. Each coastal State, however, should be authorized to define the landward extent of its coastal zone for itself." (Rept. p. 51.)

The acquisition and management of the estuarine sanctuaries recommended (Rpt. p. 65) should be placed under the jurisdiction of the Coastal Zone Authorities of the respective States. In the areas of jurisdiction of Coastal Zone Authorities the powers of the U.S. Army Corps of Engineers should be subordinate to that of said authorities. CMC further recommends that the regulatory authority of the federal government under the Rivers and Harbors Act of 1899, as so amended, be transferred to the proposed National Oceanic and Atmospheric Agency.

IV. *Continental Shelf and Deep Sea Bed.*—A. *Recommendations Approved*

Generally all regarding the organization structure of the federal government with respect to non-living marine resources set forth in Chapter 4, except as noted below.

CMC Comment.—The National Oceanic and Atmospheric Agency should not assume the mineral leasing or geologic functions of the Department of the Interior.

B. *Recommendations Questioned*

1. Recommendation that "the United States take the initiative to secure international agreement on a redefinition of the 'continental shelf' for purposes of the Convention on the Continental Shelf. The seaward limit of each coastal nation's 'continental shelf' should be fixed at the 200-meter isobath, or 50 nautical miles from the baseline for measuring the breadth of its territorial sea, whichever alternative gives it the greater area for purposes of the Convention." (Rpt. p. 145.)

CMC Comment.—We urge that the entire subject of the continental shelf and the area beyond be approached by the Federal Government with great care and with full consideration to all national as well as international objectives. We find no evidence in the report justifying the proposed new definition of the continental shelf.

2. Recommendation that "the United States seize the opportunity for leadership which the present situation demands and propose a new international legal-political framework for exploration and exploitation of the mineral resources underlying the deep seas, that is, the high seas beyond the outer limits of the continental shelf as redefined in accordance with the Commission's recommendations.

"The Commission recommends that new international agreements be negotiated embodying the following provisions:

- An International Registry Authority
- An International Fund
- Certain powers and duties of registering nations
- Limited policing functions for Registry Authority

Dispute settlement provisions

Creation of an intermediate zone." (Rpt. p. 147)

CMC Comment.—The type of regime that is established for the area beyond the continental shelf will strongly affect thinking about the width of the continental shelf and vice-versa. It is, therefore, presently impractical to consider either issue independently. Any regime that is established for the deeps should be able to improve the utilization of its resources.

Many of the other statements and conclusions set forth on pages 141–157 of the Report were also questioned by CMC.

V. *Economics of Ocean Industry*—A. *Recommendations Approved*

1. Statement that "an urgent need exists . . . for more comprehensive statistics that will further identify the areas of redundancy, improve comparability, and take into account the statistics reflecting such factors as investment, sales, and contribution to GNP.

The Government, working with industry, should develop a method to compile the data necessary to the periodic publication of the required statistics." (2 Panel Rpts., Industry and Technology, p. V-8.)

VI. *Parks, Recreation and Aesthetics*

No review except as above noted.

VII. *Education and Research*

No review except as above noted.

VIII. Interagency Council for Ocean Resources (ICOR) Comments on COMSER Report, Our Nation and the Sea.

Mr. Bissell furnished the members with copies of comments and recommendations on the COMSER Report that he had submitted to and were accepted by ICOR. The following is an extract from these comments:

"The report by the Federal Commission on Marine Science, Engineering and Resources, Our Nation and the Sea, has been reviewed by State Agencies through ICOR, and their comments received.

Of the some 140 recommendations in the report, a few appear to be of special significance to California, and it appears appropriate that a State position be presented to the Oceanography Subcommittee, House Merchant Marine and Fisheries Committee, now holding the first Congressional hearings regarding this report.

The Executive Secretary suggests that ICOR consider the report as a major accomplishment in the identification and investigation of marine oriented problems, and in the breadth and vigor of the recommendations to solve these problems.

At this time, however, he feels it would be premature to make unqualified endorsements of the recommendations generally. There are many quite controversial areas, particularly on the subject of U.S., state and international ocean boundaries and uses. Rather he suggests that ICOR support the concept of a National Oceanographic and Atmospheric Agency (NOAA) and in particular endorse certain programs and activities which should be carried out by Federal and State joint participation. Specifically:

1. The creation of a major new Civilian Agency (NOAA).
2. The enactment of a coastal management act to provide policy objectives for the coastal zone and to facilitate establishment of State Coastal Zone Authorities.
3. Increased emphasis by the Federal Water Pollution Control Administration on research into the identification of specific pollutants and their effects.
4. Develop a total integrated approach to the problems of air, land and water pollution.
5. The National Oceanic and Atmospheric Agency participate in major coastal surveys etc.

All of the 15 recommendations endorsed by the Resources Agency (see enclosed Resources Agency Review) should probably be included in the ultimate State endorsements; however, until the details of specific State action, including funding, can be worked out, the Executive Secretary recommends that the initial statement to the Congressional Committee be limited generally to an endorsement of the specific five recommendations listed above."

CMC reviewed and approved the ICOR endorsement of the five specific actions outlined above subject to the following modifications:

Item 1 should be reworded to read:

1. The creation of a major new Civilian Agency responsible for administering the Nation's civil marine and atmospheric programs (but not necessarily identi-

cal to NOAA); or the incorporation of these responsibilities into an existing agency.

Items 2, 3, and 4—No change.

Item 5—Delete as redundant.

APPENDIX I—ROSTER OF COMMISSIONERS, ADVISORS AND GUESTS

COMMISSIONERS

- Dr. W. M. Chapman¹ (Chairman), Director, Marine Resources, Ralston Purina, 739 Golden Park Avenue, San Diego, California 92106.
- Mr. Gordon Lill¹ (Vice Chairman), Senior Science Advisor, Lockheed Aircraft Corporation, P.O. Box 551, Burbank, California 91503.
- Dr. S. Russell Keim¹ (Secretary), Executive Secretary, Committee on Ocean Engineering, National Academy of Engineering, 2101 Constitution Avenue, Washington, D.C. 20418.
- Dr. F. Gilman Blake,¹ Senior Research Scientist, Chevron Oil Field Research Co., P.O. Box 446 La Habra, California 90631.
- Mr. John F. Bonner,¹ Senior Vice President, Pacific Gas and Electric Co., 245 Market Street, San Francisco, California 94105.
- Mr. Robert O. Briggs, Vice President, Dillingham Corporation, P.O. Box 1560, La Jolla, California 92037.
- Mr. Richard M. Clare, Attorney at Law, P.O. Box 186, San Maria, California 93454.
- Mr. Robert Dawson,¹ Consultant, 132 Stanford Lane, Seal Beach, California 97040.
- Honorable Ralph C. Dills, Senator from Los Angeles, State Capitol, Room 4047, Sacramento, California 95814.
- Mr. Thomas R. Gardiner, President, Gardiner Manufacturing Co., 2711 Union Street, Oakland, California 94607.
- Col. T. R. Gillenwaters,¹ Secretary, Oceanic Research Institute, 6811 La Jolla Boulevard, La Jolla, California 92037.
- Dr. John P. Harville,¹ Director, Moss Landing Marine Lab., Moss Landing, California 95039.
- Mr. Wallace Holm,¹ Architect, Wallace Holm and Associates, 1321 Monterey-Salinas Highway, Monterey, California 93940.
- Dr. Joseph Kaplan,¹ Professor, Department of Physics, University of California, Los Angeles, California 90007.
- Mr. Joseph F. Knight,¹ Vice President and General Manager, Kaiser Refractories, 2238 Kaiser Center, Oakland, California 94504.
- Mr. Robert B. Krueger,¹ Attorney at Law, Nossaman, Waters, Scott, Krueger and Riordan, 445 S. Figueroa Street, 30th Floor, Los Angeles, California 90017.
- Honorable Robert J. Lagomarsino, Senator from Ventura and Santa Barbara, State Capitol, Room 5080, Sacramento, California 95814.
- Honorable W. Don MacGillivray, Assemblyman from San Luis Obispo and Santa Barbara, State Capitol, Room 6003 Sacramento, California 95814.
- Honorable George W. Milias,² Assemblyman from Santa Clara, State Capitol, Room 4171, Sacramento, California 95814.
- Mr. J. Jamison Moore,¹ Executive Director, Modern Management, 9015 Wilshire Boulevard, Los Angeles, California 90211.
- Dr. William Nierenberg, Director, Scripps Inst. of Oceanography, University of California, La Jolla, California 92037.
- Mr. Julius Von Nostitz, President (1967-68), California Wildlife Federation, 2131 35th Avenue, San Francisco, California 94116.
- Dr. Erman Pearson,¹ Professor of Sanitary Engineering and Chairman of the Division of Hydraulic and Sanitary Engineering, Department of Civil Engineering, University of California, McLaughlin Hall, Room 114, Berkeley, California 94720.
- Mr. John G. Peterson,¹ President, Washington Fish and Oyster Co. of California, P.O. Box 3894, Rincon Annex, San Francisco, California 94119.
- Dr. David S. Potter,^{1,3} Director, A. C. Electronics, Defense Research Laboratories, General Motors Corporation, 6767 Hollister Avenue, Goleta, California 93017.
- Dr. Andreas B. Rechnitzer,¹ Director, Ocean Sciences, North American Rockwell, 350 South Magnolia Avenue, Long Beach, California 90802.

¹ Denotes commissioners present at Fifth Meeting of Commission.

² Subsequent to this meeting Speaker of the Assembly Monagan appointed Assemblyman George W. Milias to replace Assemblyman James Hayes as a member of CMC.

³ Dr. Potter submitted his resignation from CMC. He is moving out of the State.

- Mr. John D. Reilly, Vice President, Todd Shipyards Corporation, 260 California Street, San Francisco, California 94111.
- Mr. John E. Robb, Manager, Development Engineering, Bechtel Corporation, 50 Beale Street, San Francisco, California 94104.
- Dr. Milner B. Schaefer,¹ Director, Institute of Marine Resources, University of California, P.O. Box 109, La Jolla, California 92037.
- Mr. Frederick C. Stanford, Management Consultant, Louis A. Allen Associates, Inc., 615 University Avenue, Palo Alto, California 94301.
- Dr. Richard B. Tibby,¹ Director, Catalina Marine Science Center, University of Southern California, Los Angeles, California 90007.
- Mr. Georg Treichel,¹ Director, Center for the Study of General Ecology and Environmental Planning, San Francisco State College, San Francisco, California 94132.
- Dr. S. V. Wantrup,¹ Professor of Agricultural Economics, 207 Giannini Hall, University of California, Berkeley, California 94720.
- Honorable James Q. Wedworth, Senator from Los Angeles, State Capitol, Room 5046, Sacramento, California 95814.
- Prof. Robert L. Wiegel,¹ Professor of Civil Engineering, Department of Civil Engineering, University of California, Berkeley, California 94720.
- Honorable Pete Wilson,¹ Assemblyman from San Diego, State Capitol, Room 4121, Sacramento, California 95814.

EXECUTIVE DIRECTOR OF THE COMMISSION

Mr. John H. Dolan, Executive Director, California Advisory Commission on Marine & Coastal Resources, 1320 K Street, Room 502, Sacramento, California 95814.

UNIVERSITY OF WASHINGTON,
Seattle, Wash., September 15, 1969.

Congressman ALTON LENNON,
Committee on Merchant Marine and Fisheries, Longworth House Office Building, Washington, D.C.

DEAR MR. LENNON: I am submitting herewith a paper entitled "Law, Science and the Ocean" for insertion in the record of the hearings on the recommendations of the Marine Science Commission. The comments in the paper are primarily directed at some considerations pertinent to parts of the Commission report dealing with international law and policy. It also is pertinent to the subject-matter to add my opinion that the highest importance attaches to the Commission recommendation of a National Oceanographic and Atmospheric Agency. A reorganization of the executive branch similar if not identical to NOAA as recommended by the Commission deserves the strongest possible support.

Sincerely,

WILLIAM T. BURKE,
Professor of Law.

LAW, SCIENCE, AND THE OCEAN

(W. T. Burke, Professor of Law, School of Law, University of Washington)

Nearly everyone who can read or even watch television is by now aware that the ocean and the resources thereof, much being unknown, are today a subject of great interest, excitement, and hope. One of the reasons for this is that very frequently we are assured, virtually promised even, that in this vast region lie both enormous resources as well as great possibilities for international cooperation that will together solve many, if not all, our landbound problems of hunger, poverty, disease, and widespread violence. Most of this vision of a trouble-free future due to a bulging storehouse of ocean riches is an exaggeration if not a hoax. However the values that may be obtainable from the sea are surely large, despite these unfortunately magnified forecasts, and already scientists, economists, lawyers, and others are under some pressure to use their knowledge and skills to improve the production and distribution of these values.

Lawyers are now exercised about many issues, but principally with two questions: the limit on coastal control and jurisdiction over the seabed and subsoil, i.e., the continental shelf, and the nature of the regulatory system for mineral exploitation beyond this limit. The following remarks are addressed both to the substance of recent recommendations on these issues and to some possible con-

¹ Denotes commissioners present at Fifth Meeting of Commission.

sequences of attempting soon to convene an international conference of states to dispose of these issues by agreement. In particular, comments are addressed to (1) recent developments in the decision process by which legal prescriptions are devised and projected to regulate ocean activities; (2) some of the possible consequences of precipitate action to convene a new law of the sea conference; and (3) some of the substantive recommendations recently proposed by the President's Commission on Marine Sciences, Engineering and Resources.

Currently a most interesting and significant aspect of the decision process is the split between the developed states (in the sense of marine science and technology) and the lesser developed states or countries (the LDC's) that is becoming more and more apparent within international institutions. This split has special importance for ocean law in light of the method by which such law is, or has been, formulated.

The last sustained effort to promulgate general international law for the ocean began in 1949 with the initiation of deliberations by the International Law Commission, a subsidiary organ of the United Nations General Assembly. The Commission eventually, in 1956, adopted a number of draft rules on numerous aspects of the law of the sea which it submitted to the General Assembly as part of its report for that year. In submitting the draft the Commission recommended that the General Assembly convene a meeting of plenipotentiaries to examine the law of the sea and to formulate conventions on the topic. In making this recommendation the Commission also made an observation about the scope of the task before such a meeting that deserves special mention for it records an extremely important fact that is still pertinent but frequently overlooked today. This is the observation:

"The Commission is of the opinion that the conference should deal with the various parts of the law of the sea covered by the present report. Judging from its own experience, the Commission considers—and the comments of Governments have confirmed this view—that the various sections of the law of the sea hold together, and are so closely interdependent that it would be extremely difficult to deal with only one part and leave the others aside."¹

The General Assembly acted favorably upon the Commission's proposal and invited "all States Members of the United Nations and States members of the specialized agencies" to a conference to be convoked in Geneva in March 1958.

As a result of these actions and preparatory work, the representatives of 87 states gathered in Geneva in the spring of 1958 and over long weeks of negotiating hammered out four treaties on the law of the sea. By agreement it was established that Conference decisions on matters of substance required a two-thirds majority vote of those present and voting. Thus a group of thirty states could block adoption of a particular provision by the Conference.

This organized procedure whereby practically all the states of the world prescribed policies for ocean use, with each state having one vote, seems likely to be followed again if another law of the sea conference is held. Indeed the 1958 Conference virtually assured this pattern by writing in a provision in each of the four treaties that five years after the treaty came into force any contracting party thereto could request revision thereof, such request being addressed to the Secretary General of the United Nations and subject to action by the General Assembly. It seems highly unlikely that members of the Assembly will vote to deprive themselves of influence on decisions about the ocean. Whether other routes for change are feasible merits rather urgent study.

The point of this historical reference is merely to lay a base for noting that the situation has changed radically since 1958 in several ways. First, the number of players in the game has increased about 50%, there being 126 members of the United Nations at the end of the 23d General Assembly in December, 1968. Second, a conference held under the same rules as in 1958 would require a vote of 84 to adopt a provision and a blocking vote would require 43 votes instead of 30. Third, the large increase in U.N. membership is accounted for entirely by developing states, especially African which now comprise about one-third. Fourth, since 1960 the developing states have become much more organized in presenting demands and while they may not yet as a body constitute two-thirds of a new sea conference they most certainly would be able to block any proposal not to their liking. Thus the voting situation at a new conference is likely to differ drastically from that prevailing in 1958.

It is highly probable that many of the developing states will have very different views from the developed states about ocean management in terms of

priorities in use, of allocation of authority between states, on the one hand, and international institutions on the other, and of some boundary locations. A divergence in these views is detectable in the debates in the First Committee of the 23d General Assembly in the fall of 1968 when the Committee considered the Report of the Ad Hoc Committee to Study the Peaceful Uses of the Sea-Bed and the Ocean Floor beyond the Limits of National Jurisdiction.

A principal indication of the attitudes of developed and developing states is to be seen in the opposing conceptions of the desirable role and function of the Intergovernmental Oceanographic Commission. The IOC is a constituent element of UNESCO, having been created in 1960, after the 1958 Geneva Conference. It is common knowledge that the activities and policies of the IOC are influenced predominantly by the United States and the Soviet Union. The membership of the IOC is far smaller than that of the U.N. itself, now numbering about 60 with a noticeable increase in recent years. The LDC's have had little influence on the course of events in the IOC. The reason for this is not an invidious one, but primarily arises from the nature of the activities IOC has been involved in and within the years since its creation. Essentially the IOC has served a coordinating function for scientific activities in the ocean and, as is well known, such activities are limited almost completely to the developed states and even to a small group of these.

The IOC has thus far been largely a scientific and technical body, to which a minority of states belong, but this orientation may change and, indeed, in some quarters a change is being planned and promoted. It is this move to broaden the base and scope of the IOC, and to give it the key role in the implementation of the proposed International Decade of Ocean Exploration and in the long-term expanded program in international cooperation in marine science, that has attracted the opposition of some LDC's or spokesmen therefor. They have a very specific apprehension. It is simply that the political issues arising out of the ocean and its multiple uses will in some fashion or other be removed from the General Assembly and disposed of, or subjected to the jurisdiction of, another international agency such as the IOC. The effect of this would be to locate the ball game in an entirely different park where the rules are not the same and where the players might have different influence than in the General Assembly. It is this kind of sentiment which underlies the suspicions evident in the following statement by Ambassador Pardo of Malta:

We must, however, deprecate over-emphasis on exploration of the seabed and on the scientific aspects of the item before us and also clearly express our doubts on current plans which are being formulated with regard to IOC.

The proposed international decade and the Secretary General's expanded programme will produce a more rapid expansion of scientific knowledge. They will also result in a more precise evaluation of the mineral resources and of the military potential offered by the sea-bed and the ocean floor. They will, finally, considerably stimulate technological developments, which are already sufficiently rapid and which will make commercial and military exploitation easier. If, as we have every reason to believe, the ocean floor contains virtually inexhaustible mineral resources and if some areas of the ocean floor are of considerable strategic significance, the commendable scientific programmes proposed will inevitably intensify existing pressures for national appropriation and exploitation of some areas now universally recognized as being beyond national jurisdiction.

Numerous scientific papers will no doubt be circulated by IOC to member Governments on the results of the projects undertaken under the Secretary-General's expanded programme, thus contributing to the diffusion of scientific knowledge, and all countries will in greater or lesser measure benefit thereby; but, in present circumstances where an equitable international regime for the ocean floor beyond national jurisdiction is completely lacking, where indeed internationally recognized norms are so few that this area can be used, abused and appropriated with minimal risk of incurring international responsibility and where only very few States have the financial resources to engage actively in the exploitation of the seabed beyond the continental shelf, who is likely to profit most in practice, that is, economically and militarily, from the scientific programmes proposed to us? Not land-locked countries, not countries bordering on closed seas, not the developing world in general—and, I would add, not the goal of demilitarization of the ocean floor.

Nor are we convinced that at the present stage there is real need to broaden the statute of IOC or to establish an inter-agency board for this body. Mem-

bership of IOC is already open to all States Members of the United Nations and of other agencies within the United Nations system. That is in article 2 of the statute. The Commission already has the power to "consider and recommend international programmes for oceanographic investigation together with the necessary steps for their execution"; also, "the nature, forms and methods of the exchange of oceanographic data". That is in article 4 of the statute. The Commission, in short, has ample scope for fruitful activity within its present terms of reference. We also doubt that there is need to establish an inter-agency board for IOC; both the Secretary-General's proposed expanded programme and the decade of ocean exploration can be effectively implemented without this mechanism which is likely to lead to considerable bureaucratic proliferation. But our main objections to the establishment of the proposed inter-agency board are more far-reaching. We feel that such a board may contribute towards shifting the main focus of United Nations action from establishment of an international regime and of an agency empowered to administer such a regime in the interests and for the benefit of all countries to peripheral aspects of the question before us. Furthermore, a broadened and strengthened IOC, eventually developing into an international agency on the pattern of the present specialized agencies, as we have reason to believe is the intention in some quarters, would probably impede the creation of a body to administer the ocean floor beyond national jurisdiction, a body which we believe to be essential eventually if developing countries are to share equitably in practice in the benefits to be derived from the exploitation of sea-bed resources. Thus we view with considerable concern developments which, while not illogical on a purely technical or bureaucratic plane, may well endanger the long-term interests of many countries, the protection of which was the main purpose of the initiative taken by my Government.²

In short, the fear of some is that the developed states, acting in cooperation through the IOC, will mount an intensified exploration of ocean resources and an intensified program of scientific research and that the results of these programs, in the absence of deliberate actions to avoid them, will be to benefit solely the developed states, leaving the others to whistle. The issue of a regime, says Ambassador Pardo, must be kept alive in the General Assembly, for otherwise the IOC will be developed into a specialized agency and the regime, or lack thereof, will be frustrated by those who will be dominant in IOC.

This same distrust of the developed states, irrespective of ideology, is to be seen in two other developments, the reception accorded the U.S. sponsored proposal for an International Decade of Ocean Exploration (IDOE) and the handling of the issue of disarmament in the ocean. With respect to the International Decade, which had originally been advanced in March, 1968, through a White House pronouncement, the U.S. sought General Assembly endorsement through a resolution. This effort was successful, but though no vote was recorded on this issue it is understood from qualified observers that this part of Resolution 2467, adopted in December, 1968, was subject to considerable reservation on the part of developing states.

With regard to ocean military uses, it was quite clear from the very beginning of First Committee debate that both the U.S. and the Soviet Union were concerned that the question of specific disarmament measures might somehow be snatched out of the more-or-less comforting embrace of the Eighteen Nation Disarmament Committee to be deposited in the more forbidding forum of the General Assembly. Although the U.S. and the Soviet Union might not, and probably do not, yet share a common view on the scope of arms control measures in the ocean, it seems plain from their contributions to First Committee debate that they both preferred discussion of the matter be reserved primarily to the ENDC. Thus Ambassador Wiggins declared:

The main danger of an arms race on the sea-bed lies in the possibility that it may become a new environment in which weapons of mass destruction are emplaced. Even though the general subject of sea-bed arms control is already included in the present agenda of the Eighteen-Nation Committee on Disarmament, we believe it would be useful for the General Assembly to give a more precise indication of its desires to the Disarmament Committee in Geneva.

The United States strongly feels that the sea-bed and the deep ocean floor should not become an arena for an armaments race. We must work towards effective action, in conditions of mutual confidence, to enable States with the potential capability of emplacing weapons of mass destruction on the deep ocean

floor to refrain from doing so in the secure knowledge that they will not thereby be placed at a military disadvantage. This will require painstaking technical study and negotiation. It is important that we undertake this effort *in a qualified forum*, and at an early stage. (emphasis added)

The kind of expert analysis and negotiation which is needed for the discussion of specific agreements is to be found in the Eighteen-Nation Committee on Disarmament. We believe that this expert body should tackle the problem of arms control with respect to the sea-bed as soon as possible, consistent with its other arms control activities.³

The Soviet Union's observations are certainly not less suggestive than those of the United States. After general remarks which served to re-emphasize the Soviet view that the U.N. had no more than taken the first step in a long process of deliberation, the very first specific matter mentioned was that of military use of the ocean. In this intervention the Soviet Union succeeded in calling attention to the lack of agreement on the scope of a prohibition of military use, to the Soviet's devotion to peaceful uses of the ocean, and to the belief that the subject should should only be considered in the ENDC. On the latter point the Soviet representative commented:

"It was quite logical in our view to include the question of the prohibition of the use of the sea-bed for military purposes in the agenda of the Eighteen-Nation Committee on Disarmament as one of the partial disarmament measures. *This is the most correct way* to solve the problem of preventing the extension of the armaments race to the sea-bed and ocean floor. . . . May we express the hope that as a result of these debates the Eighteen-Nation Committee will soon be able to work out an international agreement on the question of the prohibition of the use of the sea-bed and ocean floor for military purposes." (emphasis added)

Developments in the ENDC since it convened in the latter part of March 1969, support very strongly the impression gained from the First Committee debates that the U.S. and the Soviet Union both are extremely determined that negotiations about military use of the ocean take place primarily outside the General Assembly. At the first meeting of the ENDC in 1969, the U.S. and the Soviet Union jointly proposed a treaty to ban nuclear weapons from the ocean floor and both President Nixon and Premier Kosygin sent messages to the Committee endorsing such an agreement. Even more significantly, for present purposes, press reports stated that it had been privately agreed by the two powers that this treaty was the number one objective at the present meeting. The importance attached to this issue is emphasized by later stories from Geneva about dissatisfaction amongst other members of the ENDC with the American-Soviet priority on this item. A *New York Times* report stated:

Angry statements yesterday showed that many at the 17-Nation Conference feel that a ban on underground nuclear tests and on production of nuclear arms should be given priority over the U.S.-Soviet sponsored ocean-floor issue.

Subsequently both the Soviet Union and the United States tabled drafts of a treaty forbidding certain military uses of the seabed beyond particular distances from coastal states. Although there are still very significant differences in the U.S.-Soviet views it seems reasonably clear that they both regard agreement, or the appearance of possible agreement, as highly desirable.

In sum both the statements of the two states and press reports lend credence to the suggestion that both the U.S. and the Soviet Union prefer negotiation and formulation of agreements in the seemingly more secure arena of ENDC in Geneva than in the 120-odd member General Assembly in New York.

(2) Recommendations of President's Commission

(a) Procedural aspects

The foregoing observations concerning perceived difficulties in international disposition of the problem of allocating authority over, and managing uses in, the ocean environment may be given sharper focus in the context of those aspects of the recommendations of the President's Commission which have to do with the international decision process. Among the most important Commission proposals are those which exhort the U.S. to "take the initiative to secure international agreement on a redefinition of the 'continental shelf' for purposes" of the Continental Shelf Convention and to "seize the opportunity for leadership which the present situation demands and propose a new international legal-political framework for exploration and exploitation of the mineral resources of the deep seas, . . ." The Commission also recommends the policies the U.S. should seek in the exercise of this initiative and leadership.

At least two different aspects of these recommendations require appraisal; these may be termed procedural and substantive. By procedural I refer to the proposal that the U.S. take initiative and exercise leadership; this proposal refers to "when" something is done and the connotation is that the U.S. must act very quickly. By substantive I mean to refer to the concrete positions the Commission recommends for the U.S. on the shelf limit and the region beyond.

The key point concerning the procedural aspect of the Commission recommendations arises because it is presumably being suggested by use of the phrases "taking initiative" and "exercising leadership" for the "immediate future" that the U.S. should accelerate the international decision process. Apparently it is felt that unless the U.S. initiates and leads, the situation will deteriorate to the disadvantage of the U.S. or that somehow we are disadvantaged by the initiatives of other states. Assuming this view of the Commission's procedural position is accurate, the question is whether it seems likely that the U.S. will suffer harm if international action is not taken immediately to redefine the shelf for the purposes of the Convention and to create a regime beyond. We are interested, first, in the evidence the Commission offers for its anticipation. Second, it is reasonable to ask whether thought was given to what costs might be incurred if the international decision process is accelerated and an international conference is convened soon.

On the question of evidence the Commission offers relatively little. Regarding the shelf limit the Commission asserts that there is uncertainty about rights beyond 200 meters and that this is deterring investment because of a lack of assurance of exclusive access. But the Commission provides no indicia of this deterrence (nor does the underlying International Panel Report) beyond asserting that "representatives of industry" agree on this deterrence theory.

This lack of evidence should not be too surprising since the fact appears to be that private enterprise (or some enterprise) have now secured leases or concessions from 28 states for operation off their coasts beyond 200 meters. If this is an illustration of deterrence it is reasonable to wonder what would happen if there were real encouragement. In short so far as the interest in encouraging offshore exploitation is concerned those who are now voting with their dollars do not seem to be especially apprehensive about the situation. If there is uncertainty it does not deter investment.

Beyond this rather brief and elementary discussion the Commission nowhere identifies trends that, unless halted immediately, threaten harm to U.S. interests. The Commission does offer criticism of a particular interpretation of the Shelf definition, that by the National Petroleum Council, but since it categorically rejects this interpretation as wholly unwarranted and without any support whatsoever it does not appear to regard the prospect of this interpretation as requiring urgent action by the U.S. in the form of taking initiatives to secure a redefinition of the shelf. More will be said on some of the Commission's observations regarding the NPC proposal when we examine the Commission's substantive recommendations.

Turning to the leadership the Commission recommends the U.S. take to secure a legal-political framework for mineral exploitation beyond the shelf, the Commission at no place seeks to establish the case for viewing this as an immediate problem. The Commission occasionally asserts that "the present situation" either "requires" or "demands" such a framework and also asserts that this "must be accomplished in the immediate future" and is needed in the "immediate future." As near as a close reading permits, however, the "present situation" is nowhere defined by the Commission except perhaps in a preceding section dealing with the availability of mineral resources and this section by no means suggests that there is any immediate need to exploit high seas minerals. On the immediacy of the need for an international regime, the Commission is content to make unsupported assertion.

In sum there is almost no discussion by the Commission of how the U.S. will be harmed or be denied benefits unless it now urges both the redefinition of the shelf and the creation of legal arrangements for mining beyond the shelf. As noted, I can also find no discussion whatsoever of the possible costs of engaging in international negotiations at this time or in the near future.

The Report of the Commission's International Panel also does not examine the possible hazards of international negotiations in the near future but does attempt to make a positive case for immediate negotiations to amend the Shelf Convention.

The Panel lists the arguments in favor of what it calls a "Wait and See Policy" and concludes that while these are "persuasive" in many respects, it would be unwise to accept them. The reasons for this conclusion are:

(1) Legal planning and scientific-technological-economic planning are mutually reinforcing, hence the former should proceed immediately on the international level.

(2) Actions may occur which cannot be changed though they affect the interests of the U.S. adversely and also the international community.

(3) The U.S. cannot, on present policies, agree to a moratorium on exploring and exploiting beyond 200 meters nor could it adopt this stance unilaterally.

(4) A wait and see policy cannot be a do-nothing policy else U.S. objectives will not be realized.

(5) U.S. objectives require (a) a decision by the U.S. not to claim permanent exclusive access to resources beyond a certain depth and not to accept similar claims by other states, (b) a determination of a plan to promote exploitation beyond a certain depth if the U.S. is to lease rights beyond that depth.

(6) The above factors, in sum, mean that even a wait and see policy requires the U.S. to decide what legal framework it prefers.

(7) Since the U.S. must decide on its preferences on a framework it "might just as well take the initiative to seek that framework and thereby help to shape the future in a constructive fashion."

The difficulty with these conclusions and reasoning is that while a wait and see policy may require decisions by the U.S. it does not necessarily lead to the conclusion that we must or should take the initiative to urge immediate negotiations. Whether one does take the initiative may depend on *other* factors not related to this problem. Further, the actions taken as an initiative may differ from a call for immediate negotiation.

The situation now does not call for the exercise of initiatives by the U.S. and while some leadership is required it should be exerted quite differently than the Commission suggests. The prime international problem we face is not that of securing a desirable international framework for deep ocean exploitation but rather one of seeing to it that U.S. and world community interests on a variety of issues are satisfactorily met. A framework for a type of ocean use which on the best available estimate (that of the Marine Resources Panel) is a quarter century away cannot be regarded as a priority question. It is quite possible that there will be some sporadic deep sea mining ventures in the period before the year 2000 but it is subject to considerable doubt whether the political difficulties resulting therefrom are likely to be so serious as presently to require the construction of a legal system.

In contrast to the Commission's recommendation of urgent action to deal with the immediate future, the critical point, it seems to me, is that the U.S. ought to urge both (1) the necessity for allowing ample time to states to prepare for international negotiations on the issues that are likely to be dealt with when the shelf limit and regime problems are dealt with in an international conference and (2) the interim measures by which there is reasonable assurance that alternative arrangements are not precluded by the progress of technology and of selfishness. If this is what is meant (or is not incompatible with) the exercise of leadership and initiative then I am all for the latter. For the situation we confront seems to me to be amply clear. The general outlines of this situation have already been suggested in previous discussion, but more precise indication may be useful.

The key matter to understand is that neither the U.S. nor the Soviet Union nor the two together is likely to be permitted to convoke a meeting which will dispose solely of certain limited issues selected because of their special concern and importance to one or both of such states. The International Law Commission called the Assembly's attention to this general point over a decade ago in noting the interdependence of numerous issues in the law of the sea. If anything, a close relationship between seemingly unconnected problems of ocean policy is more pronounced today than a decade ago in Geneva. It may be recalled, for instance, that three of the four Geneva conventions on the law of the sea (those on the High Seas, Territorial Sea, and Continental Shelf) are all by their terms subject to calls for revision at about the same time (June and September 1969) and the fourth, on Conservation of Living Resources, is similarly subject in 1971, probably before a general conference on the law of the sea could be convened.

What this means is that for the U.S. to take leadership and exercise initiative on the topics suggested by the Commission as *immediately* needed, in all proba-

bility entails the submission of still other issues to international discussion and negotiation, at least unless this difficulty is anticipated and avoided. Thus if the U.S. pushes to reach international agreement on a narrow continental shelf as the Commission proposes and to secure agreement on a specific seabed regime (or on any other proposal concerning these topics), it seems to be only prudent to inquire what other issues will be considered and how these issues might have to be adjusted in order to secure the kind of agreement we seek on the shelf limit and the regime beyond. It certainly is not at all beyond anticipation that there will be a strong move by some states, perhaps a large number:

- (1) to secure agreement on a wide territorial sea;
- (2) to make it entirely clear (as it is not now) that warships do not enjoy a right of innocent passage through the territorial sea;
- (3) to assure exclusive fishing rights in a wide fishing zone as a possible alternative to a territorial sea of a particularly wide sort;
- (4) to establish new and more severe restrictions upon the conduct of scientific research; and
- (5) to place special restraints on military uses of the seabed, the water column and the surface.

In the proper exercise of prudence the U.S. and other states would each certainly have to determine how their exclusive interests are affected by alternative disposition of these issues and would attempt to estimate how other states might vote to resolve these issues. In the process a decision must certainly be made concerning what of these and other issues deserves priority and how much weight is to be placed on this or that resolution of an issue in relation to other issues.

If this picture of the future is reasonably accurate, and certainly past experience suggests this pattern of events is likely, it seems to me reasonable to wonder why the Commission did not address this problem specifically. It does not appear to me to be satisfactory to observe, as the Commission did, that its recommendations are inter-related and that if one is rejected it "would raise serious questions in the minds of the Commission as to the advisability of continuing with the others." The point is that the issues involved *are* inter-related not only among themselves but with still other ocean issues such as fishing and military uses. In the end it seems to me unusually difficult to understand exactly what the Commission is recommending. If, as seems most likely, one or several of the Commission's recommendations will be changed then apparently we are left without any Commission recommendations as to U.S. policies on these issues.

It is not my purpose to suggest that the task of evaluating the interests of the numerous states concerned will always be so complex that the negotiating process is impossible in the sense that one cannot entertain reasonably reliable expectations about the outcome. It will some time be necessary to confront some very delicate issues in a large international gathering and to reach more or less realistic conclusions. At some time in the future this confrontation will be a reasonable proposition. My point is rather that we need time for thorough preparation for such a meeting and this time should be sufficiently extended that we can get a better idea than anyone now has about the resources of the ocean floor including the geological shelf, slope, rise and beyond. I suspect this means that an international conference should not be convened before 1975 at the earliest and more likely 1980.

Having said this it seems to me necessary to add that this preference is very unlikely to be realized. A far more reasonable prediction is that a general international conference will be convened before 1975, perhaps even sooner, and that it will be essential for the developed states to have made as extensive preparation as is possible by that time. Thus, the urgent problem confronting policy-makers is how one prepares for negotiations in circumstances characterized by (1) a widespread ignorance of the marine environment and its resources; (2) a strong drive by developing states to secure a share in the "common heritage"; (3) an equally (at least) strong feeling on the part of these states of distrust of some or all of the developed states in their military use of the ocean; (4) a widespread suspicion among LDC's that the conduct of marine science research is prosecuted by the developing states primarily in order to obtain exclusive rights to valuable resources (which may not be there); (5) an international decision process which will be overwhelmingly dominated by developing states possessing little or no home-owned capability in ocean use with the exception of fishing.

(b) Substantive aspects

The Commission's substantive recommendations call for:

(1) A definition of the continental shelf to fix the limit at the 200 meter isobath or 50 nautical miles from the baseline, whichever includes the greater area.

(2) The creation of an intermediate zone out to the 2500 meter isobath or 100 nautical miles from the baselines whichever includes the greater area. In this zone only the coastal state or its nationals would be permitted to explore or exploit, but the framework of regulation would otherwise be that which applies to the area beyond the intermediate zone.

(3) The conclusion of an international agreement establishing a regime for the areas beyond the continental shelf. Basically the Commission proposes a registration scheme, with provision for collecting and distributing revenues.

This framework the Commission recommends "for the immediate future" but believes it will take years to arrive at such a framework. Accordingly the Commission recommends that the U.S. "propose the principle that no nation, in the interim, should claim or exercise sovereignty or sovereign rights over any part of the seabed or subsoil beyond the 200-meter isobath." The U.S. should continue to authorize exploration and exploitation beyond the limit "provided such authorization states that any such exploration or exploitation shall be subject to the new international framework agreed upon." Recognizing the deterrent effect of this, at least in part, the Commission further recommends that "Congress enact legislation to compensate private enterprise for loss of investment or expenses occasioned by any new international framework that redefines the continental shelf so as to put the area in which it is engaged in mineral resources development beyond the shelf's outer limits."

Although labelled "interim", the recommendation that the U.S. and other states refrain from claiming or exercising sovereignty or sovereign rights beyond 200 meters is for several reasons probably the most significant of these recommendations for a legal framework. First, a principle of this kind, if not of the same detail, would seem essential if some definite limit is to be placed on outward expansion of coastal control over the seabed. Second, it is at least somewhat surprising that the Commission suggests 200 meters since the U.S. has already claimed rights beyond this limit, as apparently have numerous other states. Thus, the Commission is recommending that the U.S. and other states not only accept a shelf limit they rejected in 1958 but also that they now retract the extension of sovereign rights which were properly made in accordance with the limit agreed upon in the 1958 Convention. If the U.S. were to amend the Outer Continental Shelf Lands Act to accord with this proposal, as the Commission apparently recommends, some outstanding leases would no longer be on the U.S. shelf although they would, for the time being, still be subject to U.S. control. Third, unless this interim limit were generally adopted, the prospects of acceptance of the Commission's long-term proposal, which seem none too sanguine anyway, would become virtually non-existent. Fourth, the Commission's interim proposal is more restrictive of coastal rights than even Malta proposes. At the March 1969 meeting of the U.N. Seabed Committee, Malta originally offered a resolution which called for an interim limit of 200 meters or an unspecified limit in miles. Such a formulation at least anticipates that pre-existing claims might not be affected by a new international regime.

The basic difficulty with the Commission's interim recommendation appears to me to be that it both turns the clock back and has a high potential of frustrating wholly legitimate expectations. The clock-turning-back goes to the practicality of the Commission's proposal, not its wisdom. It is at least difficult to anticipate that the large number of states who wished in 1958 to have a limit greater than 200 meters would now be willing to accept a lesser limit. Perhaps the perceived advantages of an international regime will be large enough to persuade states to accept the 200-meter/50-mile limit, but it is not unreasonable to incline to doubt this.

The more serious shortcoming appears to arise from the Commission's suggested policy that leases now or in the future granted beyond 200 meters become subject to a future international regime. The Commission recommends that the loss private enterprise might incur, if such a regime is less favorable, be shared by the enterprise and the community. To protect private enterprise against "undue loss" "The Commission recommends that the Congress enact legislation to compensate private enterprise for loss of investment or expenses occasioned by any new international framework that redefines the continental shelf so as to

put the area in which it is engaged in mineral resources development beyond the shelf's outer limits."

It is in the first place questionable whether compensation ought to disregard legitimate expectations of return on investment which are frustrated by the new regime. Certainly if the investment itself is lost, the future returns on it, which may well be demonstrable, are also going to be lost. Secondly, it seems to me rather questionable whether all states can or will follow the policy here recommended only for the United States. It is one thing to suggest that the U.S. provide compensation which it could more or less easily afford but it is an entirely different matter to make the same demand of Equatorial Guinea, Gabon, Ghana, Guyana, Honduras, Jamaica, Malaysia, Mauritania, Panama, Peru, Philippines, Senegal, Sudan, Surinam, and Trinidad, all of which have issued leases or concessions beyond 200 meters⁵ and none of which occupy so favorable a wealth position as the United States. Since this Commission recommendation could not practicably be implemented in many instances, and since U.S. companies would therefore frequently be the losers, this particular episode of U.S. leadership could turn out to be costly to the United States.

Moreover if fear should exist that other states could not adopt such compensatory policies, the consequence could be to deter the future investment the Commission says it wishes to encourage. If uncertainty does act as a deterrent to investment, as the Commission argues in another context, it may be that the Commission's own recommendations will serve just such a function. At the very least it is less than clear that the policies the Commission recommends for the U.S. can actually be employed by many other states around the world.

Turning, finally, to the Commission's substantive recommendations on the shelf limit and the regime beyond, only brief appraisal is attempted here of some of the less technical but still significant elements. It deserves notice, initially, that the Commission Report offers only very sketchy discussion of these issues, far less than is warranted by the Commission's own estimate of their importance. Surprisingly even the International Panel Report offers but skimpy augmentation of the Commission text.

The bulk of the discussion in the Commission Report is devoted to criticism of the position advocated by the National Petroleum Council in its Interim Report for the Department of the Interior. A key element of this criticism is the conclusion that neither the "language" nor the "history" of the continental shelf definition warrants the interpretation that coastal rights extend to the entire continental land mass, i.e., to the geological shelf, slopes, and at least the landward portions of the continental rise.

It seems difficult to establish that the Shelf Convention sets out any explicit limit on the shelf even though there was undoubtedly an intent to indicate there *was* a limit on coastal expansion. What the Geneva Conference apparently sought to do was to achieve both some certainty (hence the 200-meter limit) plus sufficient flexibility to take into account unpredictable technological and economic progress (hence the exploitability criterion in the alternative). It was very clearly anticipated that sovereign rights could extend beyond 200 meters when the requisite conditions came to exist. However it is also quite clear that the conferees in Geneva did not believe they had disposed of the entire ocean floor, i.e., they were aware there was a limit but did not seek to establish what it might be in advance of the social-political-economic-technological context which would call for and permit more precise definition. In the meantime the limit was to move outward as exploitation moved outward, to the limit of adjacency, until the Convention could be revised.

In this context the contention that the NPC position has no warrant in either language or history of the Convention is only a partial truth. The Convention definition can reasonably be interpreted to permit expansion of the shelf limit to the edge of the continental land mass (and a few believe even further) as exploitation becomes feasible so long as the limit is still "adjacent" to the coastal states. Accordingly the Commission statement, when coupled with its recommendation for imminent revision of the Convention definition, either magnificently begs the question or is self-fulfilling, for unless the definition is revised the shelf boundary probably would in time reach the submerged edge of the continental land mass. At the same time the NPC position also is not an acceptable interpretation of the Convention insofar as the NPC declares that the shelf definition *now* extends coastal sovereign rights to the continental margin. The Convention itself obviously does not explicitly define the shelf in terms of the continental land mass and it could have done so if a sufficient consensus to that

effect then existed. The Panamanian proposal appeared to incorporate this position and was rejected in the Fourth Committee, receiving only four affirmative votes.⁶ While the Convention might be interpreted to anticipate the possibility of the shelf extending to the end of the continental margin, it does so only as Article 1 permits expansion of the boundary with advancing exploitation. Most significantly, the Convention also contains a provision, referred to earlier, which permits revision of the definition *before* exploitability has pushed the shelf boundary to the end of the continental margin. Hence it seems to me to be impossible to accept the notion that the Convention presently allocates sovereign rights to the extent the NPC suggests.

In rejecting the NPC proposal for a shelf limit the Commission comments that it would "create the danger" that some states "will feel justified in claiming exclusive access to the superjacent waters, the living resources in them, and the air above" their continental slopes and rises. The Commission then states that "The danger that rights of exclusive access for one purpose may extend to claims of territorial sovereignty or exclusive access for all purposes materialized as an unforeseen and undesirable consequence of the Truman Proclamation of 1945."

If Dr. John Craven does not attain immortality in some other way, an outcome not lightly to be dismissed in view of his ingenuity, he may secure this in measure by virtue of the now common reference to "Craven's Law", by which is meant the notion that jurisdiction claimed over the ocean floor will inevitably seep upward to control events in the space above. It is this apprehension which the Commission sees as a danger in connection with the NPC concept of a relatively wide continental shelf. Craven's Law, which has been much discussed but seldom examined in light of the historical record, certainly deserves some investigation to see if, as I believe, there is less to it than meets the eye.

The usual evidence cited to prove the existence of the Law consists of the extravagant action of a very few states—now eight out of over 100 coastal states—in asserting a claim to a very wide territorial sea of 200 or more miles, which claim some of them advanced in apparent response to the Truman Proclamations of 1945. [It should be noted, in passing, that the Commission's depiction of the past is somewhat selective. There were two Truman Proclamations in September, 1945, one dealing with fish beyond the territorial sea (and treating them differently than oil) and one dealing with the continental shelf. The Latin American states reacted to *both* proclamations and in so doing refused to distinguish between shelf resources and resources in the waters above as the U.S. Proclamations did.] However, it is notable, but seldom mentioned by believers in Craven's Law, that in a quarter-century only a small handful of states have reacted in this way and their positions are almost universally regarded as contrary to international law. Except for these instances of extravagant behavior, there appear to be no other unusually extensive territorial claims resulting, even colorably, from narrower assertions by another state of certain limited jurisdiction and control.

Another bit of assumed evidence consists of the recent difficulties experienced by foreign scientists in getting consent from coastal states to do certain research on the continental shelf. This is cited to show that having conceded the coastal state a measure of control over the seabed and subsoil these states naturally extend the control upwards to interfere with the wholly different activity of research. The short answer to this "evidence" is that it bears an unfortunate lack of resemblance to reality. The fact is that these claims to affect research are not an unforeseen development involving unilateral expansion of authority but result from the firm agreement of numerous states, an agreement which was actively sought by the United States, the one state obviously likely to suffer the most from this control by other states over research. It was not at all inevitable that coastal states be given, or would claim, this control, especially since no one has ever demonstrated that the conduct of research with open publication of results, has *any* harmful effects on coastal states. It is perhaps ironic that this instance of alleged unilaterally expanded jurisdiction was in fact expressly authorized in a general international agreement at the apparent insistence of the United States Navy, yet this alleged expansion is now decried by a prominent member of the Navy scientific establishment whose name is commonly attached to this supposed phenomenon. Lewis Carroll would be quite at home here.

In sum, as near as one can see from examining what states do in practice, in contrast to what some people say they do, Craven's Law has no basis. If states are now expanding their exclusive authority, as they are, the phenomena

requires another explanation. Similarly, the Commission's more specific version of the Law has no general application.

Immediately after these references to Latin American jurisdictional claims, the Commission offers the following pronouncements:

"Such developments are obviously contrary to traditional U.S. policy to limit national claims to the sea in the interest of the maximum freedom to the multiple uses, including military uses, which the United States makes of the oceans. National Security and world peace are best served by the narrowest possible definition of the continental shelf for purposes of mineral resources development."

The latter sentence is, in my opinion, the most unfortunate and unwise to be found in the Commission Report. To cast virtually the entire argument for immediate revision of the shelf limit (else it won't be the "narrowest possible") in terms of "national security and world peace", words of the highest level of abstraction, virtually prevents rational response and surely inhibits an exchange of views. About the best one can do is make a general denial and ask for the Commission or its members to offer some details about why world peace and national security require as the Commission says they do. Fortunately the time is rapidly passing when important international policy matters can easily be disposed of in the United States merely by waving the magic wand of "national security", thereby summarily terminating discussion. At least insofar as acceptance of a Commission recommendation is concerned it seems to be entirely proper to ignore the supposed military justification until such time as some more detailed pronouncement is forthcoming to clarify the bearing of national security on this matter. The opportunity for developing a reasonably clear statement of military factors pertinent to the shelf question existed for the two-year life of the Commission. In view of this opportunity it seems now wholly unreasonable to ask for blind acceptance of a recommendation that appears to be based primarily upon undisclosed military considerations.

The Commission's recommendations of a shelf limit and its strong words about the NPC position on the shelf perhaps require some special consideration in light of the recent decision by the International Court of Justice in the North Sea Continental Shelf Cases. The Court there rejected the position that Article 6 of the Shelf Convention was already part of customary international law and held that Germany, which had not ratified the convention, was not obliged to delimit its North Sea shelf in accordance with the equidistance principle. For present purposes the important part of the decision is the observation by the Court that the most fundamental rule of law pertaining to the continental shelf is that this area comes within the sovereign right of the coastal state because it is a natural prolongation of the land territory and that this area and rights over it inhere in the coastal state without need for proclamation or pronouncement or any act whatsoever. Obviously such rights do *not* arise from agreement—they exist independently of the Shelf Convention. At the same time the Court acknowledged that some provisions of the Convention, especially Articles 1-3, were ones "which, it is clear, were then (in 1958) regarded as reflecting, or as crystalizing, received or at least emergent rules of customary international law relative to the continental shelf, amongst them the question of the seaward extent of the shelf; . . ."⁷

Thus the Court states that all coastal states possess rights over the shelf because the latter is a natural prolongation of the land mass but that the extent of such rights is not (apparently) coequal with the prolongation because the customary law is that found in Article 1 of the Convention, i.e., 200 meters or to the depth admitting of exploitation. In this view all states have the same shelf limit irrespective of their adherence to the Shelf Convention.

If we may take these statements by the Court as representing international law on the issue of the shelf limit, and no doubt we should however aptly they may be regarded as dictum, their effects upon subsequent discussion of the Commission's recommendations may be important. First, it is now apparent that in suggesting certain revision of the Shelf Convention, i.e., a shelf defined as extending to 200 meters or 50 nautical miles, the Commission is proposing a change in customary international law. This means that a new treaty definition, as contrasted to present Article 1, will be effective only as to those states which accept the amended treaty at least until such time as the new definition becomes so generally accepted that it becomes customary law, replacing the present "customary" limit. The Court makes it very clear in this connection that acceptance of the Shelf Convention by about 40 states is "hardly sufficient" by itself to convert a "conventional rule" to a "general rule of international law."⁸

The result of this new development is, therefore, that states could have a very clear choice. Unless satisfied with a new limit on the shelf, as contained in a revised treaty on the subject, states may continue to rely on the customary definition in which the key terms are "exploitability" and "adjacency". In practice some states have interpreted these terms to authorize extension of their shelf to points much deeper than 200 meters and more than 100 miles from their baseline. The United States, it should be noticed, is one of the leaders in this extension of the shelf, claiming areas more than 100 miles from the coast and at depths much greater than 200 meters.

For these reasons the content of the customary law on the shelf limit is of special significance and the Court's treatment of this matter is of particular interest. The decision contains pronouncements which appear to indicate that in the Court's view the present shelf limit (200 meters or exploitability, as modified by adjacency) is a rather narrow one. Unfortunately virtually all these pronouncements are mere dictum and appear to have been made without any reference whatsoever to state practice. Moreover some of the Court's observations appear to be contradictory of others, leaving it rather difficult to envisage precisely which views are predominant.

The Court's treatment of the concept of "adjacency" is especially significant since it is this term which establishes the limit on exploitability as a means of expanding the shelf limit. The Court referred to a number of terms used in State proclamations and in treaties—"near", "close to its shores", "off its coasts", "opposite", "in front of the coast", "in the vicinity of", "neighboring the coast", "adjacent to", "contiguous"—and said they were all "terms of a somewhat imprecise character which, although they convey a reasonably clear general idea, are capable of a considerable fluidity of meaning." The Court examined one of these terms:

To take what is perhaps the most frequently employed of these terms, namely "adjacent to", it is evident that by no stretch of imagination can a point on the continental shelf situated say a hundred miles, or even much less, from a given coast, be regarded as "adjacent" to it, or to any coast at all, in the normal sense of adjacency, even if the point concerned is nearer to some one coast than to any other. This would be even truer of localities where, physically, the continental shelf begins to merge with the ocean depths.

While these remarks were made essentially to demonstrate that "adjacent" and "proximity" do not possess the same meaning in the context of a three-state delimitation problem, the suggestion is that the "continental shelf" 100 miles from the coast, or even less than that distance, does not fall within the sovereign rights of any coastal state. Thus for all its reliance on the "natural prolongation" doctrine as the fundamental basis for the legal concept of the continental shelf, the Court apparently does not accept that the legal shelf is always coextensive with the natural prolongation. At some point, even "much less than" 100 miles, present customary law puts an end to coastal control. Or so the Court seems to say.

Unfortunately the message is perhaps not so clear as these passages seem to suggest. The Court also states that the entire North Sea area is composed of continental shelf, being shallower than 200 meters, and appears to regard its parcelling out by the bordering states as permissible under the Convention and customary law. Yet there are parts of the North Sea that are much more than 100 miles from any of the surrounding states. Unless such parts are "adjacent" they could not be lawfully claimed as shelf by any of the states concerned. At no place does the Court suggest that the North Sea area is unique, calling for a different set of laws.

Whatever the scope of the Court's statements on adjacency, there is a very clear implication that in the Court's view the present limit on the shelf does not necessarily embrace the slope and rise, i.e., if the slope and rise are part of the "natural prolongation" of the continental land mass, as they seem to be, it does not follow that they are part of the legal shelf. If any part of this "natural prolongation" were automatically within the shelf there would be little of significance in the Court's remarks about adjacency.

On the other hand if the NPC position is not now the international law of the sea, the Court's opinion may well provide strong support for the proposal that this position is to be preferred when states do finally establish a certain limit for the shelf. The Court's rationale for the very existence of a legal shelf, i.e., it is a prolongation of territory over which an adjacent state exercises sovereignty, may now appear also to be a suitable rationale for locating the limit on such sovereign rights.

Incidentally, in this connection, a few comments are pertinent regarding the National Petroleum Council position that the shelf now extends to include all the submerged portion of continents. On this assumption the NPC Report castigates the Commission recommendation of a 200 meter/50 mile shelf as "patently a needless and dangerous give-away of a vital segment of the American mineral estate. . . ." I do not agree with the Commission's recommendation as to the U.S. final position on this point (although it might well be the starting point if negotiations must occur rather soon), but I do not at all share the assumption which underlies the NPC view. Further it seems to me that Professor Auerbach is completely right in noting that what we are concerned with here is determining what the "American mineral estate" is and, accordingly, we are not much aided by such boot-strapping argumentation as the NPC advances.

One final aspect of the Commission recommendations deserving mention are those which have to do with providing greater freedom than now prevails for the conduct of marine science research. The Commission devoted special consideration to this important problem and devised a highly desirable set of proposals by which, if adopted, progress can be made. The only disturbing aspect of the Commission's work in this regard derives from its recommendations for a political-legal framework beyond the continental shelf which appear largely to have been conceived without paying much attention to their impact on scientists.

In recommending an intermediate zone the Commission does state that "scientific inquiry concerning the bed of the intermediate zone undertaken there will not require the coastal nation's prior consent." Unfortunately there is reason to doubt whether it will prove possible to conclude an agreement to this effect. The principal basis for this doubt is that the Commission proposes to require that *all* claims to explore for minerals beyond the continental shelf must be registered with an international registry authority. Within the intermediate zone only the coastal state or its licensees would be authorized to explore or to exploit mineral resources. Beyond this zone the first registrant receives the exclusive right to explore in a particular area for particular mineral resources. The question this system will raise, probably inevitably, is how to distinguish between marine science research and mineral exploration. It is already painfully clear that no objective distinction can be discerned between these activities on the shelf, hence there is ample reason for concern over the same problem beyond the shelf.

If there is concern to protect exclusive rights of mineral exploration both in the intermediate zone and in the deep sea bed, it is not easy to see how a system can be established which will not interfere with research.

Coastal states may merely extend their present apprehensions (though they have little foundation for them) about research in the shelf region to the zone beyond. In the enormous expanse of seabed outside the zone, the international authority would presumably have to do something to assure its licensees that exclusivity is protected. In either event it would not be surprising if the registry authority felt compelled to establish some administrative regulations and procedures especially directed at marine science research. That these techniques would impede marine science can be taken for granted, unless scientists seek to use their influence to avoid this result. It is not reassuring to recall that from 1955 to 1958 scientists sought unsuccessfully to warn that the Continental Shelf treaty then under consideration would very probably interfere substantially with scientific research. On the other hand the sad experiences under the shelf treaty, which scientists had fully anticipated, may have taught state officials a lesson and perhaps similar future difficulties might be avoided. Unfortunately there is little evidence of sufficiently widespread concern over the shelf problems to cause one to have much optimism about heading off some new difficulties for marine science.

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5. This information is derived from Appendix F of National Petroleum Council, Petroleum Resources under the Ocean Floor 100-01 (1969).

6. The text reference is to U.N. Doc. No. A/Conf.13/C.4/L.4: "For the purpose of these articles, the common expression 'continental shelf' is used as referring to the seabed, soil and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, including both constituent parts of the continental terrace, namely the continental shelf proper and the continental slope with its gorges, valleys, depressions and ravines, as far as the further points at which the depth of the superadjacent waters admits of the exploitation of the natural resources and the said areas of the continental slope, but excluding the great depths of oceanic basins." 6 Official Records, United Nations Conference on the Law of the Sea 127 (U.N. Doc. No. A/Conf.13/42) (1958).
7. North Sea Continental Shelf, Judgment, I.C.J. Reports 1969, para. 63, p. 39.
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MASSACHUSETTS INSTITUTE OF TECHNOLOGY,
DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING,
Cambridge, Mass., August 9, 1969.

Prof. THOMAS A. CLINGAN, JR.,

Counsel, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR PROFESSOR CLINGAN: Word has just reached me of your appointment as Counsel to the Subcommittee on Oceanography in connection with the hearings on the Stratton Report. May I extend congratulations and all good wishes. The Subcommittee has important work cut out for it in bringing the results of the Presidential Commission's recommendations into line with national policy.

For what it may be worth, I take liberty in enclosing a review article on the Commission's report just published in *The Technology Review* under the title "Alternatives for Ocean Policy."

I should have appreciated an opportunity to present my views on the Commission's recommendations to the Committee. This was out of the question with an early autumn deadline on a book. If you deem the observations worth communicating to others, and if it would be in conformity with Committee policy, I should have no objection to the article being reprinted with the hearings. I feel sure the Editor of the Review would share this position.

I am particularly interested in getting across the views expressed with respect to the proposed international licensing authority. This impresses me as being unnecessary at this time and even possibly harmful to long-run American national interests. It would limit our freedom of action in an area that is vital to our security and tie our hands in the development of ocean resources.

I expect to be in Washington in the middle of September and would be pleased to discuss matters with you if you would care to do so.

Sincerely,

NORMAN J. PADELFORD,
Professor of Political Science.

[From the Technology Review, July/August 1969]

ALTERNATIVES FOR OCEAN POLICY

(By Norman J. Padelford, Professor of Political Science, Emeritus, M.I.T.)

Norman J. Padelford is Professor of Political Science Emeritus and Senior Lecturer in the M.I.T. Departments of Political Science and of Naval Architecture and Marine Engineering. Educated at Denison and Harvard Universities, he has worked with the Department of State and with the United Nations on problems of international organization. Professor Padelford has specialized in studies of international political organization and, more recently, in work on ocean resources. He is the author of numerous books including *Public Policy and the Uses of the Sea* (M.I.T. Press, 1969). He is a founding member of the Board of Editors of a new journal entitled *Journal of Maritime Law and Commerce*.

Multiple pressures are forcing nations to "go down to the seas" anew. The motives are more pragmatic than the poet had in mind, however—more raw ma-

terials, increased supplies of foodstuffs, new energy sources, and more effective defense.

The oceans constitute 71 percent of the earth's surface. Within the restricted land space left for man must be accommodated the needs of 3.5 billion people today. And somehow we must find room for the estimated 6.5 billion expected in the year 2000. Secretary of the Interior Walter Hickel has suggested, in hailing the aquanauts who lived for 60 days under the sea in Project Tektite, that in the future "whole new cities" may be constructed under water.

The world yield of food per capita, almost stationary since 1950, strongly suggests that new supplies must quickly be found. The ocean is capable of producing much larger harvests than the fishing industry is now gathering if new equipment, better methods and careful cultivation replace the archaic means being used in many places. The world need for fish is expected to grow by an additional 40 million tons (67%) by 1985, according to latest estimates of the Food and Agriculture Organization of the United Nations.

The increasing depletion, and rate of use, of mineral resources on land suggest increasing demands on marine supplies (see David Brooks' article in this issue). One result will almost surely be to aggravate the existent pollution problem. The condition of the ocean near principal cities makes us painfully aware of the quantities of noisome wastes being dumped into the sea. As more oil wells are drilled on the continental shelf and 300 to 500,000-ton super tankers become commonplace, the risks of pollution will rise exponentially.

All of these issues suggest the need for national and international discussion of the general direction in which ocean policy should be moving. Should the federal government mobilize an effort comparable to that employed in developing nuclear energy to accomplish new missions in the ocean? Or should private enterprise be left to get what it can with the means at its disposal, as the oil industry has done, restricting the role of government to licensing, overseeing, setting quotas, insisting on competition, and possibly controlling prices?

How far should the United States go in cooperating with others, inside or outside of the United Nations, in joint surveying, mining, and food production—or in the search for new laws? Should we support the creation of new international machinery to control the use of the sea beds in the interests of mankind?

The issues at stake are complex. What is done on some of them now will affect the freedom of choice on other matters later, regarding not only our livelihood but our power and influence in world affairs as well. A time of decision is at hand.

THE MARINE RESOURCES ACT OF 1966

Impetus for a new ocean policy in this country began with a recommendation by the National Academy of Sciences in 1959 for a 10-year national effort to extend research and knowledge of the seas, to draw additional manpower into marine science and engineering, and to develop new vehicles for underwater activity.

Portions of this program were advanced by Presidents Eisenhower and Kennedy. But it remained to the 89th Congress to pass the first comprehensive ocean legislation in several decades—the Marine Resources and Engineering Development Act of 1966. This placed the Congress on record in favor of federal support for education, research and technological improvements in marine engineering, and affirmed the intention that this country remain a leader in ocean science and engineering.

It created the National Council on Marine Resources and Engineering Development, under the chairmanship of the Vice President, to replace the ineffectual Inter-Agency Committee on Oceanography. To this Council the Congress gave the power to initiate programs, to integrate the activities of 27 government agencies, to assign responsibilities, and to advise the President.

In its first three years, this Council has brought a measure of order into the national ocean picture. The task of fashioning a long-range ocean strategy has begun. The federal budget for spending on ocean research has risen from \$20 million in 1960 to \$400 million in 1968-69.

The 1966 Act also made provision for the appointment of a Presidential Commission to formulate recommendations for a more "adequate" oceanic program, together with proposals for a permanent administrative structure within the federal government. The report of this Commission on Marine Science, Engineering and Resources (chaired by Julius A. Stratton, President-Emeritus of M.I.T., now chairman of the Ford Foundation), entitled *Our Nation and the Sea: A Plan for National Action*, is now before the government for action.

THE STRATTON COMMISSION PLAN

President Nixon has yet to make his response to the Commission's plan for action. Meanwhile, the Congress has begun hearings on the proposals. It is difficult to predict what will eventually issue from the congressional mill. Much will depend upon the tenor of the President's recommendations.

Dr. Stratton and his colleagues, drawn from government, private enterprise, and academic life, have exercised care to keep key members of the Congress informed. Wisely, the Commission had a four-member, bipartisan, team of congressmen as advisers—Senator Norris Cotton, Senator Warren Magnuson, Congressman Alton Lennon, and Congressman Charles Mosher.

Briefly, the Commission recommends that research in basic marine science be expanded with a diversity of support; that capability be sought to occupy the bed and subsoil of the territorial sea to 2,000 feet, and to explore to 20,000 feet by 1980; that undergraduate education in ocean engineering be broadened and support for graduate programs be expanded. At the same time the Commission stressed the need for the country to have a few very strong national laboratories for work in ocean science.

For management of the coastal zone the Commission finds the present federal, state, local machinery inadequate, and favors a coastal management act.

On pollution, it is recommended that the Army Corps of Engineers be given power to refuse permission for the construction of new plants that would affect the purity of waters. Federal enforcement procedures should be reviewed.

In the realm of fisheries the Commission recommends continuing federal subsidies for rehabilitating the U.S. domestic fisheries; encouraging conservation; establishing priorities for the development of new species; developing better fishing technology; expanding support for the production of fish protein concentrate; and entering into stronger international arrangements to rationalize total sea catches. Shipbuilders may be horrified (while economists may be heartened) at the thought of opening the door to the use of foreign-built shipping, which is generally cheaper, while allowing American industry to concentrate on other activities in which it excels, such as packing and processing.

Although it recommends support for advancing aquaculture, the Report does not give this the emphasis which the urgent needs of the world suggest, given what is known about Japanese, Chinese, Malay, and other Asian practices in intensive fish cultivation.

As to marine minerals, "strong federal support" is urged for a program to advance the fundamental technology of undersea mining and recovery.

Professional oceanographers, as well as the Navy and ocean engineers, are given emphatic support for a long-range program of research exploration, and advancement of technology. Activities visualized here include, among other things, expanding data networks; studying ocean systems and continental drift; major research efforts in marine biology; supporting studies of advanced deep ocean stations, man-in-the-sea projects, and stable off-shore platforms; advancing knowledge and capability in deep ocean technology with new submersibles and instrumentation; improving environmental prediction and studying the feasibility of modifying the global environment.

The International Decade of Ocean Exploration, announced a year ago, should be helpful in furthering many of the activities mentioned, although specific agreements will be needed where coordinated endeavor is required.

The recommendations have built solidly upon the foundations laid in 1959 by the Committee of the National Academy of Sciences. They give impressive backing to the pleas of the scientific community for strong leadership in oceanic affairs. They afford a blueprint for ocean policy for the decade to come, as envisaged by the 1966 legislation. The responsibility now lies with the Executive and the Congress.

DEFINITION OF THE CONTINENTAL SHELF

There are two areas in which the Commission's recommendations may be questioned. One of these is the suggested redefinition of the continental shelf.

The Commission proposes limiting national jurisdiction on the shelf to the 200-meter isobath or 50 miles from shore, whichever gives the adjacent state the greater area. In the area between the 200- and 2,500-meter isobaths, or out to 100 miles from shore, the Commission would have an International Registry Authority give preferential treatment to the claims of adjacent state interests.

This formula would deprive states of rights which they now enjoy under the 1958 Geneva Convention on the continental shelf—primarily, the right to control

who shall work the seabed in front of their territories—and give an international body the right to make money by granting exploratory and exploitation leases—at fee rates of its own fixing—to nationals of the state itself, as well as to foreigners, in vital security areas off their own shores.

Historically the oceans have been viewed by international law as being the property of no one beyond territorial limits. The right of states to control the use of the offshore sea has been a prerogative of sovereignty. Assertions of jurisdiction in the territorial sea have for the most part been exercised with restraint. Most states have limited claims to three and 12 miles. A small handful have claimed exclusive rights for as much as 100 to 200 miles.

Claims to resources lying on or beneath the floor of the continental shelf date to 1945. In that year President Harry S. Truman asserted exclusive title to the resources of the shelf surrounding the territories of the United States. This was motivated by a desire to ensure national possession of mineral resources in the shelf, and by a fishing controversy which had existed with Japan prior to the war.

Other states followed suit as more was learned of the potential importance of resources on the continental margins. Ecuador, Peru, Chile, and some other Latin American states utilized President Truman's proclamation—which explicitly disavowed claims to jurisdiction of the waters and over navigation above the shelf—to advance territorial claims reaching out as far as 200 miles from shore. Few of the states had knowledge of the resources lying on or beneath their shelf. In the case of Argentina, this move afforded a convenient additional means of claiming title to the Falkland or Malvinas Islands occupied by Britain. For the states on the west coast of South America it gave grounds for restricting the operations of foreign vessels engaged in tuna fishing off their coasts.

After a decade of intensive study by national authorities and international legal groups, the Geneva Conference on the Law of the Sea, at which a majority of maritime nations were represented, agreed to a definition of the continental shelf which is incorporated in the Convention on this subject.

This reads as follows:

"... the term 'continental shelf' is used as referring to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said area. . . ."

At stake in the difference between the Commission's proposal and the text of the 1958 Convention is the exploitation of the slope and the rise in which the continental shelf typically terminates. It now appears possible that the slope and rise may be important areas for mineral and energy sources; indeed, the U.S. Department of Interior is reported to have issued leases extending on to the slope.

Within a few years the petroleum industry will have the capability of working on the slope. One of the wells in the Santa Barbara Channel is said to have been drilled in water 1,300 feet deep. And the *Glomar Challenger* on her recent voyage in the South Atlantic is reported to have drilled corings of the ocean floor in depths up to 19,000 feet.

To tie the hands of industry and government in those portions of the continental margin lying beyond the 200 meter isobath by a redefinition of the shelf could take away valuable resources from national control.

There is doubt to what extent it would be advantageous to reopen the Geneva Convention at this time. There are more parties with interests in the shelf today than there were in 1958. Also, a multiplicity of interests now focus in the boundary of the shelf—notably defense, navigation, fishing, mining, and foreign affairs. Each is interlinked with the others.

The boundary at the continental margin cannot be settled according to historical analogies on land. Considerations of geological structure, exploitation and competence to employ technology are more applicable. The most vital factor is that the slope and rise are an integral part of the land mass of a continent. There is no natural dividing line.

Where numbers of nations border upon shallow seas that extend from shore to shore—as along the North Sea and the South China Sea—satisfactory arrangements have been arrived at. No serious international disputes exist over the boundaries of the continental margins of the United States. No nation is challenging United States rights to control the use of the resources lying within its continental margin. Discussions at the United Nations relate primarily to the seabeds of the high seas.

Rather than reopening the laboriously negotiated Geneva Convention to try to reach a new generalized definition of the shelf, it would seem better to delineate the shelf on a pragmatic basis, instance-by-instance, as occasions arise—particularly in view of the limited extent of today's knowledge about the underlying character of the shelf in many parts of the world.

The "intermediate zone" proposed by the Commission is also open to objection. Rather than holding national jurisdiction in the seas within strict limits, as United States policy has always tried to do, this idea would, in my opinion, encourage states to expand their claims to exclusivity toward the 100-mile line in order to obtain title or bargaining power over the maximum potential resources possible. The situation could end up more confused than it now is.

More seriously, the "intermediate zone" idea would entitle an international body to interfere within an area which numerous states hold to be vital to national security. The United States has an aircraft identification zone (A.D.I.Z.) that extends out several hundred miles into the Atlantic and Pacific, for example. Should an international body be given rights to inspect, police, and control leases within such areas, disputes could arise that would hardly be in the interests of peace and security.

It proved impossible between 1958 and 1960 to enlarge the area of agreement on the law of the sea beyond that incorporated in the Geneva treaties. There is no indication that the nations are prepared to go farther today. On the contrary, the area of agreement appears to be narrowing.

In relation to national defense, the values of the slope and rise in particular are just beginning to be seen. As capability to work here becomes an accomplished fact, use of this region for listening, detection, housing defense installations, and other purposes will multiply in much the same way as outer space technology has opened up new vistas of concern for national security there.

INTERNATIONAL LICENSING AUTHORITY

A second area in which the Commission's recommendations are open to challenge is in relation to the proposed International Registry Authority. The Commission recommends that the United States take leadership in negotiating agreements that will establish an International Authority to register national claims for exploring and exploiting areas of the deep sea bottom beyond the redefined continental shelf.

The nations would undertake not to engage in or authorize action without first registering a claim to a particular area. On a "first-come, first-registered" basis, registration would give "the exclusive right to engage in or authorize such exploitation in a large enough area and for a long enough time to enable the producer to operate economically . . . and to recover its original investment as well as an adequate return thereon. The size of the area covered by the claim and the term of years for which it is registered should be fixed by the Authority."

By alert maneuvering, foreign parties might succeed in laying claims to extensive tracts of seabed on the outer edge of the continental shelf off the coast of Maine or off the South Atlantic states, where the shelf extends out more than one hundred miles. Should this occur, it would allow alien parties to become lodged on our doorstep regardless of local security or economic interests.

It is desirable for the United States to take leadership in world affairs, but it is questionable whether this particular suggestion is in the larger national interest. An I.R.A. would be allowed to give away rights to resources in areas physically joined to the American land mass where these could be developed by American industry, and would require states to pay fees—which an Authority composed of a majority of the newer countries would be tempted to set high.

It is difficult to believe that the Congress of the United States will favor such a give-away program, or support an international authority that will have the power to "inspect all stations, installations, equipment, and other devices" in claimed areas. This sounds close to an authority with supranational powers over states.

The establishment of an international agency for settling conflicting claims on the abyssal sea floor or over midoceanic ridges or seamounts may eventually be in order. There is ample machinery now in existence, however, for settling such disputes whether by political means, or by arbitration or judicial settlement. Many states have bilateral arrangements with others for mixed claims procedures. Nearly all states are members of the Permanent Court of Arbitration and of the International Court of Justice at the Hague. It hardly seems necessary to pile Ossa on Pelion further simply because there is increased

activity in the oceans. Each additional layer of authority multiplies the costs and red tape.

FEDERAL ORGANIZATION

At the national level, the Marine Science Commission has proposed a grouping of ocean activities under a National Oceanic and Atmospheric Agency—N.O.A.A.—in place of the existing National Council on Marine Resources and Engineering Development.

By law the National Council will continue in being until the Congress passes new legislation creating some other arrangement. The National Marine Council has done a commendable job of initiation, coordination, and direction in the past two years under the leadership of Vice President Humphrey. On the other hand, the Council is limited in its power to act. It is a poor competitor for funds and impinges heavily upon presidential staff time. Above all it is not an appropriate vehicle for a strong operating agency with mission tasks that stretch across a wide spectrum of concerns—scientific, engineering, industrial, governmental.

The Commission on Marine Science is correct in saying that "a system relying upon coordination of organizationally dispersed activities" is not a substitute for a "single operating agency having authority and capability commensurate with the scope and urgency of the national ocean program."

The suggestion of forming a new department of government has merit, but would involve surgical severance of numerous agencies from their present departmental ties. There is reason to believe this would be resisted within some of the more powerful departments, and might entail unhappy ties with other associates.

The proposed National Oceanic and Atmospheric Agency would initially encompass the Coast Guard, the Environmental Sciences Services Administration, the Bureau of Commercial Fisheries, the Sea Grant Program, the National Oceanographic Data Center, and some other bureaus. It would leave other activities where they are now located in the Navy, Interior, Transportation, State, and other departments, together with N.A.S.A., the Atomic Energy Commission, and elsewhere.

This compromise would bring some related activities together leaving problems of coordination still to be resolved with others. The arrangement will, if carried through, assemble under one roof approximately 55,000 employees, some 320 vessels, numerous aircraft, the principal oceanographic laboratories, and other facilities. Such a team would command a strong leader and a good manager.

Coordination of activities left under the responsibility of other agencies would be vested in the head of N.O.A.A. The same responsibilities now reside with the Executive Secretary of the National Marine Council but the head of N.O.A.A. would be stronger because he would have a large operating organization behind him. But the Congress must make it clear in its legislation, if it accepts this plan, that the head of N.O.A.A. is to have such a function, under the direction of the President, and that his role is to be supreme in this respect.

With the precaution suggested, the National Oceanic and Atmospheric Agency could mark a constructive step forward comparable with N.A.S.A., the Office of Science and Technology, and the Atomic Energy Commission.

The program recommended by the Commission would cost on the order of \$650 million a year between 1971-75 and by 1980 approximately \$1 billion a year. Taking the 10-year period the costs are estimated to come to a total of \$8 billion. Given the squeeze that is now mounting on tax dollars in this country and the competition of other major programs, there is serious question how much of a chance the Marine Science Commission stands of getting the dollars it is asking for.

The delay of the Nixon administration in responding to the Stratton Commission Report is deplorable. It may not fatally undermine congressional progress, for there is considerable steam within the Congress for action in this area, but it suggests that ocean engineers and oceanographers may have to settle for less than they would like.

Each nation must set its own house in order to establish consistent and effective programs. The Report of the Marine Science Commission goes a long way in affording a comprehensive, logically consistent blueprint. At the same time, all nations must recognize that adjustment of individual interests in the light of broader needs and a willingness to reach mutually advantageous arrangements afford the path to the maximum benefit of all.

(Whereupon, at 11:40 a.m., the subcommittee adjourned, to meet at 9:30 a.m., Tuesday, October 28, 1969.)

